

Taxonomic revision and zoogeographical patterns of the species of *Gnopharmia* Staudinger, 1892 (Geometridae, Ennominae)

HOSSEIN RAJAEI SH.¹, DIETER STÜNING¹ & ROBERT TRUSCH²

¹ Zoologisches Forschungsmuseum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany;
E-Mail: eagle426@uni-bonn.de or eagle4261@yahoo.com; d.stuening.zfmk@uni-bonn.de

² Staatliches Museum für Naturkunde Karlsruhe, Erbprinzenstraße 13, D-76133 Karlsruhe, Germany; E-Mail: trusch@smnk.de

Abstract

The genus *Gnopharmia* Staudinger, 1892 is revised, based on more than 2000 specimens from the entire area of distribution and study of type material of all described taxa, as far asmap available. Seven species and three subspecies are confirmed as valid for the genus. All important morphological characters have been studied and compared, including male and female genitalia. In addition, preliminary results of DNA-Barcoding were used to reassess our taxonomic decisions, based on morphological studies. Type specimens and their labels are illustrated and additional specimens, demonstrating the variability of certain species, are also figured. Male genitalia of all valid species are figured and SEM photos of the aedeagus are illustrated. Further important structures, the so-called ‘octavals’ on the male pre-genital abdomen, are also figured. Female genitalia revealed a high similarity between species, combined with a considerable variability, and were unsuitable for characterisation of species. Female genitalia of three species are figured to exemplify this situation. As a result of the morphological and genetic studies, 12 out of the 21 described species and subspecies are synonymised or transferred to the closely related genus *Neognopharmia* Wehrli, 1953. In addition, *G. colchidaria cocandaria* (Erschoff, 1874) is revived as a valid species, *G. sinesefida* Wehrli, 1941 is downgraded to a subspecies of *G. colchidaria* Lederer, 1870. Five new records for the fauna of the following countries are presented: *G. colchidaria objectaria*: new for Pakistan; *G. irakensis*: new for Turkey and Pakistan; *G. kasrunensis*: new for Oman and *G. sarobiana*: new for Pakistan. Distribution maps and an identification key are given for all species.

Key words: Macariini, *Gnopharmia*, *Neognopharmia*, new synonyms, new records, lectotype designations, distribution, Iran

Introduction

The Palaearctic Geometrid genus *Gnopharmia* Staudinger, 1892—despite its name having been composed of ‘*Gnophos*’ and ‘*Boarmia*’ by Staudinger—is a member of the tribe Macariini (Ennominae). Wehrli (1953: 365) previously stated this, based on the characters of the male genitalia. Scoble and Krüger (2002) revised the Macariini at the generic level and also included *Gnopharmia* therein. Parsons et al. (1999) listed 13 species, but two of them (*cataleucaria* Staudinger, *horhammeri* Brandt) are members of the closely related genus *Neognopharmia* Wehrli, 1951. The most recent state of knowledge at the species level was presented by Scoble & Hausmann, 2007, who listed 11 species (19 taxa including all subspecies in total).

All species of *Gnopharmia* are difficult to identify, and previous authors often misinterpreted or overestimated external differences which resulted in unnecessary descriptions of mere variations as new species or subspecies. After description of the first species of this genus by Lederer (1870; as “*Gnophos colchidaria*”) from Georgia, Erschoff (1874) described the second species belonging to the genus as *Boarmia cocandaria* from Kokand (near Soch, East Uzbekistan). A further six new taxa were described by Staudinger (1892): *G. colchidaria* var. *objectaria* and *G. c.* var. *degeneraria* (from Ashkhabad in Turkmenistan), *G. maculifera* from Samarkand in Uzbekistan, *G. rubraria rubraria* from Jerusalem and two localities in Southeast Turkey (Aintab, Marasch [Maraš]), and *G. rubraria subrubraria* from Margelan, also in East Uzbekistan. Wehrli (1938) described *G. colchidaria melanotaenia* from Meghri [as Migri] in Armenia and *G. irakensis* from Rawanduz in Iraq. Later he introduced a further three new species: *G. erema* Wehrli, 1939 from Kerbela, Iraq, and, based on material of the famous collections of Fred Brandt from Iran, *G. kasrunensis* Wehrli, 1939 (Kunar Takhteh, Kazerun) and *G. sinesefida*

Wehrli, 1941 (Fort Sine Sefid, Fars, S. Iran). Almost a quarter of a century later, *G. sarobiana* Ebert, 1965 was described from Sarobi in East Afghanistan; this was soon followed by Wiltshire's (1967) description of six new taxa, four from Afghanistan: *G. maculifera afghanistana* from Pul-i-Khormi, *G. objectaria luxuriosa* from Bashgul valley in Nuristan, *G. eberti* from the Arghandab river area near Kandahar, and *G. inermis* from Herat. Three years later, Wiltshire (1970) described a further two new taxa from Khorasan, Iran: *G. maculifera kasyi* and *G. inermis vartianae*. Not earlier than 1998, he published two photos of a "*G. musandamensis*" from a locality called "Musandam" in Oman as "new species" on the back cover of the journal "Tribulus", but without adding a description. We consider this as a *nomen nudum* in the sense of the ICZN. However, the specimens turned out to belong to *G. kasrunensis* and are an interesting new record for the fauna of Oman. "*Gnopharmia*" *cataleucaria* Staudinger, 1901, as cited by Parsons et al. (1999: 406), was mentioned by Staudinger in his catalogue (1901: 344) as a variation of "*Gnophos*" *stevenaria* Boisduval (1840). Wehrli (1953) accepted this treatment but described the new genus *Neognopharmia* for *stevenaria* (Wehrli, 1953). To our present knowledge, *cataleucaria* Staudinger is a distinct species and correctly placed in *Neognopharmia* which is a genus close to *Gnopharmia*. "*Gnopharmia*" *horhammeri* Brandt, 1938 is also a member of *Neognopharmia*. Both species are presently being transferred to this genus in a revision of *Neognopharmia* (Norbert Pöhl, Bad Ischl, Austria, in prep.).

Because of the delusive variability of wing pattern and the resulting, confusing taxonomy in the genus, most *Gnopharmia* specimens in Lepidoptera collections are not well identified at the species level. But differences of the genitalia structures are also not conspicuous at first glance. Therefore we mainly focused on a more detailed study of the genitalia morphology, using scanning electron microscope (SEM) techniques. We included the type material of almost all taxa in our study and analyzed a large number of non-type specimens from many collections. In addition, DNA sequencing was performed on more than 200 specimens. As a result, we were able to more or less clarify the taxonomy of the genus and to provide a comprehensive identification key for all species. Moreover, we can present a first reasonable overview of the distribution of the species of *Gnopharmia*.

Materials and Methods

This study is based on more than 2000 adult specimens of *Gnopharmia*, obtained from the following institutional and private collections (as far as included, acronyms after Evenhuis & Samuelson 2007): BMNH—The Natural History Museum London, UK ; HMIM—Hayk Mirzayans Insect Museum in the Iranian Research Institute of Plant Protection (former Plant Pests and Diseases Research Institute), Tehran, Iran; MNHU—Museum für Naturkunde der Humboldt-Universität, Berlin, Germany; NHMW—Naturhistorisches Museum Wien, Austria; PCDS—Private collection Dirk Stadie, Eisleben, Germany; PCJG—Private collection Dr. Jörg Gelbrecht, Königs Wusterhausen, Germany; PCJM—Private collection Dr. Jörg-Uwe Meineke, Kippenheim, Germany; PCMS—Private collection Manfred Sommerer, Munich, Germany ; PCRF—Private collection Ralf Fiebig, Roßleben, Germany; SMNK—Staatliches Museum für Naturkunde, Karlsruhe, Germany; ZFMK – Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany; ZISP—Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia; ZMMU—Zoological Museum of Moscow State University, Moscow, Russia; ZSM—Zoologische Staatssammlung München, Munich, Germany. Other abbreviations: m a.s.l. = meters above sea level, H. R. = Hossein Rajaei.

About 200 specimens were collected by the senior author in Iran, especially in the years 2009 and 2010. More than 900 genitalia dissections of males and females were made, using standard procedures (Robinson, 1976). In addition, 40 specimens were studied via SEM using a Hitachi S-2460N (at ZFMK). Genitalia preparation for SEM was made following the HMDS protocol (Oshel 1997) (for detailed information about this protocol see Rajaei, 2010). Other structures like forelegs and antennae also have been preserved as permanent slides. Specimens were photographed using an Olympus E-3 digital camera, and genitalia slides were photographed using a digital stereomicroscope (ZEISS-SteREO: Discovery. V20, ZFMK). Line drawings were made for several other important structures. DNA sequencing was performed at the Canadian Centre for DNA Barcoding, University of Guelph and also at ZMB (Center of Molecular Biodiversity Research) at ZFMK, Bonn. The results obtained so far are used here preliminarily, just to support or contradict our taxonomic conclusions drawn on the basis of morphological studies. More detailed molecular methods and analyses will be presented elsewhere (Rajaei et al, in prep.). Spelling of geographical names follows the Road Map of Iran of 2005, published by Gitashenasi, Geographical & Cartography Institute (www.gitashenasi.com).

Results and Discussion

The genus *Gnopharmia* Staudinger, 1892

Type species: *Gnophos colchidaria* Lederer, 1870, by original designation by Staudinger, 1892 (see Taxonomic note below).

Description. Wings and body. All species in the genus small to medium-sized, with a wingspan between 21 and 30 mm. The ground colour of wings varies from dark brown to light brown or greyish-white (sand-coloured), sometimes with a reddish or orange hue. Transverse lines obsolete or represented by dark brown or grey spots on the veins, on the costa or on hind margin. In most specimens, a thin, white, zigzag-shaped submarginal line present, at least near apex, and the space between this narrow and the postmedial line of dots is very often represented as a dark grey band. Also often the whole postmedial area is darkened, with the submarginal line visible inside. This band is much more conspicuous on the under side of the wings, its colour being dark brown, grey or almost black and the remaining part of the wings almost white, but not in all specimens. Others have the under side rather indistinct, light brownish, speckled with darker scales and the broad postmedial band only slightly darker and even narrower. These strong variations occur intraspecifically in both sexes. Also in many specimens, but not always, a light brownish, yellowish or sometimes white apical patch is present, also on under side. Venation (see fig. 3a): R_1 and R_2 completely coincident, arising at a short distance from upper angle of cell, not anastomosing with Sc and with the common stalk of R_{3+5} . Base of 1A curved around fovea. Cell-spots small, but usually well defined on both wings, larger on under side, darker than the remaining pattern elements. Termen of forewings slightly and evenly rounded. Externally, sexual dimorphism is not very strong: the females are slightly larger and have the wings a little broader, in the males the wings are narrower, with the apex rather acute, and a fovea is present (fig. 3b). Antennae of females are filiform, shortly ciliate, in males they are bipectinate, apart from the terminal 12–18 segments (fig. 2a). Transitional zone between pectinated and unpectinated segments short. The rami of the male antennae are long and narrow, dorsally scaled, densely setose ventrally and arise distally from the elongated basal segments. The latter are about two times as long as their diameter. Frons (see figs 1a–b; Viidalepp, 1988: 136, figs 5–8) moderately or strongly conical, distally rounded, sometimes slightly invaginated along its distal margin, with an additional, round protrusion in the centre. Large, unscaled, ventrally pointed genae laterally beneath frons present (see fig. 1c). Palps short and rather narrow, reaching or slightly exceeding the tip of the frons; basal joint with larger, protruding scales. Haustellum well developed. Vertex covered with large, lamellar scales; extended chaetosemata present, but without medial connection. Fore legs with long epiphysis and a tibial spine in both sexes (often hidden behind scales; absent in *irakensis*; see figs 2b–e), in hind legs tibia not dilated, without scent-brush; index of spurs 0–2–4. Abdomen without setal comb on sternite 3, sternite 8 distally with a pair of elongate, apically rounded processes (“octavals”, fig. 4, 1–2).

Male genitalia (fig. 4, 3–10). Uncus broad at base, quadriform, densely setose dorsally, with a short, narrow tip, without ‘horns’ (the latter present in many other genera of Macariini, see Scoble & Krüger 2002). Gnathus with strong, flattened lateral arms and a rounded, smooth medial plate. Valva divided into dorsal and ventral parts; dorsal part elongate, with costa sclerotized and a setose, apically rounded cucullus; ventral part of valva (sacculus) with two strongly sclerotized, tooth-like projections. Aedeagus long (dependent on species 1.2–1.5 mm), evenly curved in lateral view, with a ventral fin (except in *irakensis*), with one or two groups of subapical spines, and fused or single cornuti on the vesica which may be absent occasionally. Basal part of vesica covered with field of minute spines (see fig. 43c).

Female genitalia (fig. 4, 11–17). Eighth abdominal segment short, rather membranous, with short and strong apophyses, ovipositor short, papillae anales ventrally covered with specialized setae (‘floricornus’: setae with an expanded, scoop-like head) (see also figs 47a, b) and with numerous long, fine setae dorso-laterally. Bursa copulatrix membranous, globular to pear-shaped, with a very large, stellate signum of variable shape, but without a mushroom-like stalk. Ductus bursae narrow, strongly bent at the middle, sclerotized in posterior half, sclerotized antrum rather short (described as long in Scoble & Krüger 2002, who consider the posterior, sclerotized part of the ductus bursae as belonging to the antrum). Sterigma consisting of a broad, sclerotized antevaginal band and narrower lateral and postvaginal bands, the latter with a lens-shaped sclerite in the centre (see also figs 45 & 46). The female genitalia of all *Gnopharmia* taxa are very similar and also variable in a number of characters. No distinct differences have been discovered so far that allows us to distinguish the species on this basis. This is even true for the supposed females of *G. irakensis* whose males are very different from all other *Gnopharmia* males concerning their genitalia.

Table 1. Differential morphological characters of <i>Gnopharmia</i> and <i>Neognopharmia</i> .		
	<i>Gnopharmia</i>	<i>Neognopharmia</i>
frons	conical, distally truncate	moderately rounded
chaetosemata	elongate	round
antennae	bipectinate, with apical 12-18 segments simple, rami long, dorsally scaled, arising distally from basal segments	like <i>Gnopharmia</i> , rami shorter
margins of wings	evenly rounded	curved between veins (<i>stevenaria</i>)
fovea in male forewings	present	present
venation	R ₁ and R ₂ coincident	R ₁ and R ₂ stalked shortly, R ₁ anastomosing with Sc (<i>stevenaria</i>)
fore leg	epiphysis as long as tibia, or slightly longer; tibial spine present in most species (except in <i>irakensis</i>)	like <i>Gnopharmia</i> ; tibial spine absent.
hind leg	tibia not dilated, without hair-pencil	like <i>Gnopharmia</i>
sternite A3 of abdomen	without setal comb	without setal comb
sternite A8 of abdomen	octavals present	octavals present
valvae	divided, sacculus with 2 tooth-like processes	divided, sacculus with 4-6 tooth-like processes (<i>stevenaria</i>)
aedeagus	shaft with subapical spines and ventral fin	shaft without subapical spines and without ventral fin
vesica	with cornuti of variable size, multiple, fused on a common, sclerotized base, or absent	with a long, stick-like cornutus
ovipositor	floricomus present	floricomus present
bursa	with a very large, stellate signum	like <i>Gnopharmia</i> , signum smaller

Diagnosis. Within the tribe Macariini, there is only one other genus sharing a number of characters with and being obviously closely related to *Gnopharmia*: *Neognopharmia* Wehrli, 1953. *Neognopharmia* shares with *Gnopharmia* the structure of the antennae (apical segments not pectinated, rami scaled dorsally, arising distally from the flagellomeres), the presence of a fovea on the male forewings, the structure of the legs (long epiphysis of fore legs, unmodified tibia of hind legs), the absence of a setal comb on sternite 3, the presence and similar form of octavals, the form of the valva in male genitalia (separated into dorsal and ventral parts), and the presence of a floricomus. But also the differences are distinctive (see Table 1), and therefore we believe that *Neognopharmia*

deserves full generic rank. At present (according to Parsons et al., 1999) only the type species *stevenaria* Boisduval, 1840 is included, but in a forthcoming revision, three other species, including a new one from Pakistan, will be added. One of them, *horhammeri* Brandt, 1938, was already mentioned as a member of *Neognopharmia* by Wehrli (1953: 568), and a second one as var. *cataleucaria* Staudinger of *stevenaria*.

Taxonomic Notes. Staudinger (1892: 184) designated *G. colchidaria* (Lederer) as the type-species of *Gnopharmia*: “therefore I think that this *Colchidaria* together with its varieties will best be placed into a special genus for which [...] I propose the name *Gnopharmia*” [original designation; translated from German]. Fletcher’s (1979: 91) statement “Type-species *Gnophos colchidaria* Lederer, 1870, by subsequent designation by Prout, 1915, in Seitz, Gross-Schmett. Erde 4: 383” therefore is incorrect. Prout (l.c.) states “I have only seen the typical species (*colchidaria*) which unites the appearance of a *Gnophos* with the structure of a *Boarmia* or *Tephronia*” [translated from German]. Wehrli (1953: 568) described *Neognopharmia* as a new subgenus (“subg. nov.”) of *Gnopharmia*, but already two years earlier (Wehrli, 1951: 8) published a note about it, there referring to a description seemingly already published (but in fact published two years later in Seitz 4, Suppl.). In this note he mentioned “*Ctenognophos*” *stevenaria* Boisduval as being anatomically related to *Gnopharmia*, and as already placed into the new subgenus (“nouveau s-g.”) *Neognopharmia*. He also mentioned *G. horhammeri* Brdt. [Brandt] as “new species” (i.e. new addition) of this subgenus. Parsons et al. (1999: 634) accepted this as a valid description and also upgraded the subgenus to full genus rank. We also think that *Neognopharmia* deserves full genus rank, but we believe that the 1951 description is invalid: *stevenaria* is not designated as type species, but merely as one of two species belonging to the new subgenus, there is no description included (ICZN, articles 13.1.1, 13.3, 13.6). According to article 13.6, a name described later than 1930 cannot be made available by “indication” (i.e., by mentioning one or more valid species names in combination with the new subgenus name). Therefore we propose that *Neognopharmia* should be cited as mentioned above: Wehrli, 1953: 568. Scoble & Krüger (2002), in their “Review of the genera of Macariini,” do not mention the genus *Neognopharmia* and treat *stevenaria* within the genus *Gnopharmia* (according to our studies this is not justified).

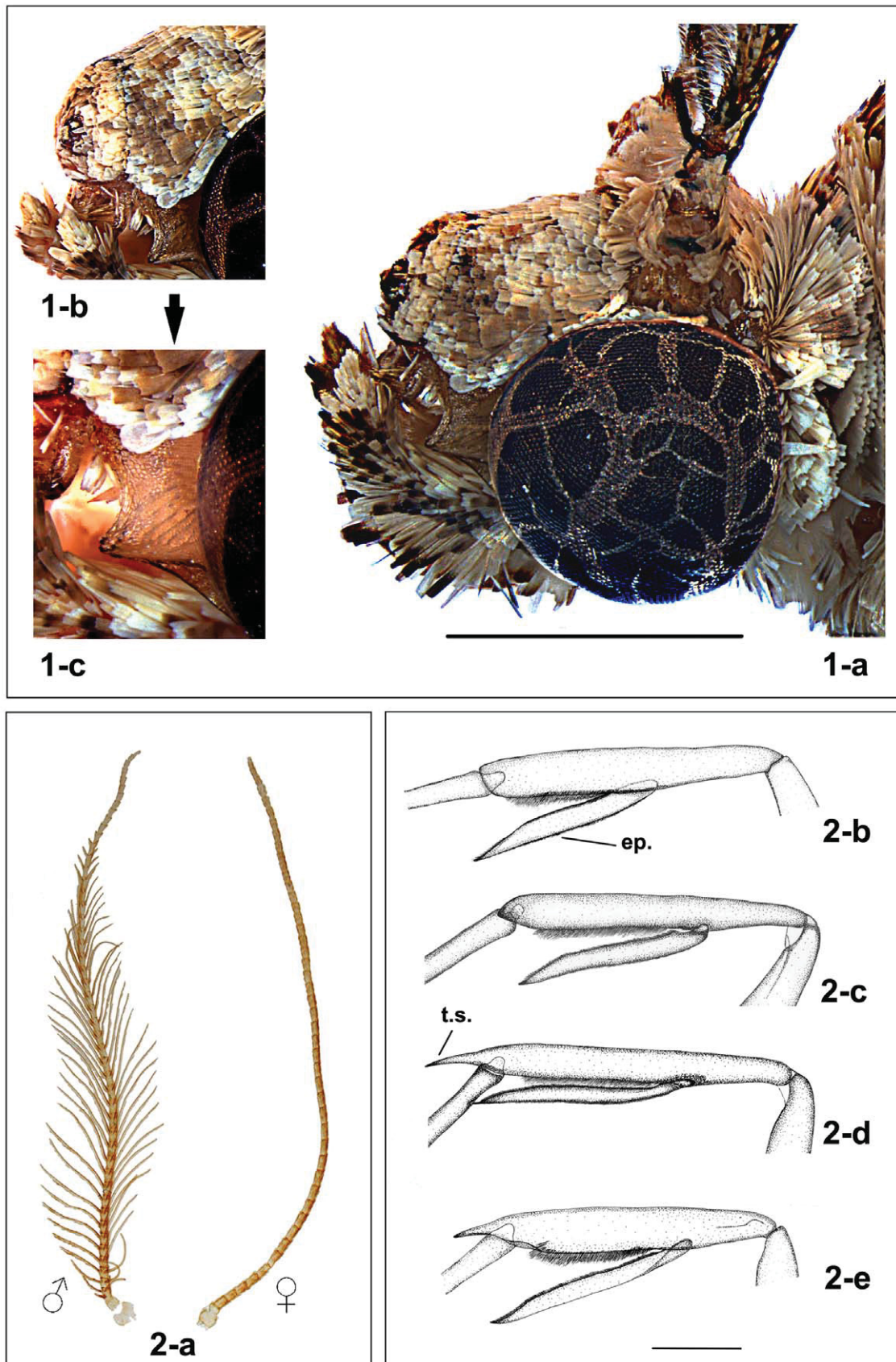


FIGURE 1–2. *Gnopharmia*, structures of head, antennae and fore legs: 1-a, lateral view of head (scale bar: 1 mm); 1-b, frons; 1-c, gena (*G. colchidaria objectaria*, male); 2-a, male and female antennae (*G. colchidaria objectaria*); b-e, fore tibia structure in: b, *G. irakensis*; c, *G. colchidaria colchidaria*; d, *G. colchidaria sineseffida*; e, *G. cocandaria cocandaria* (ep.: epiphysis, t.s.: tibial spine, scale bar: 0.5 mm).

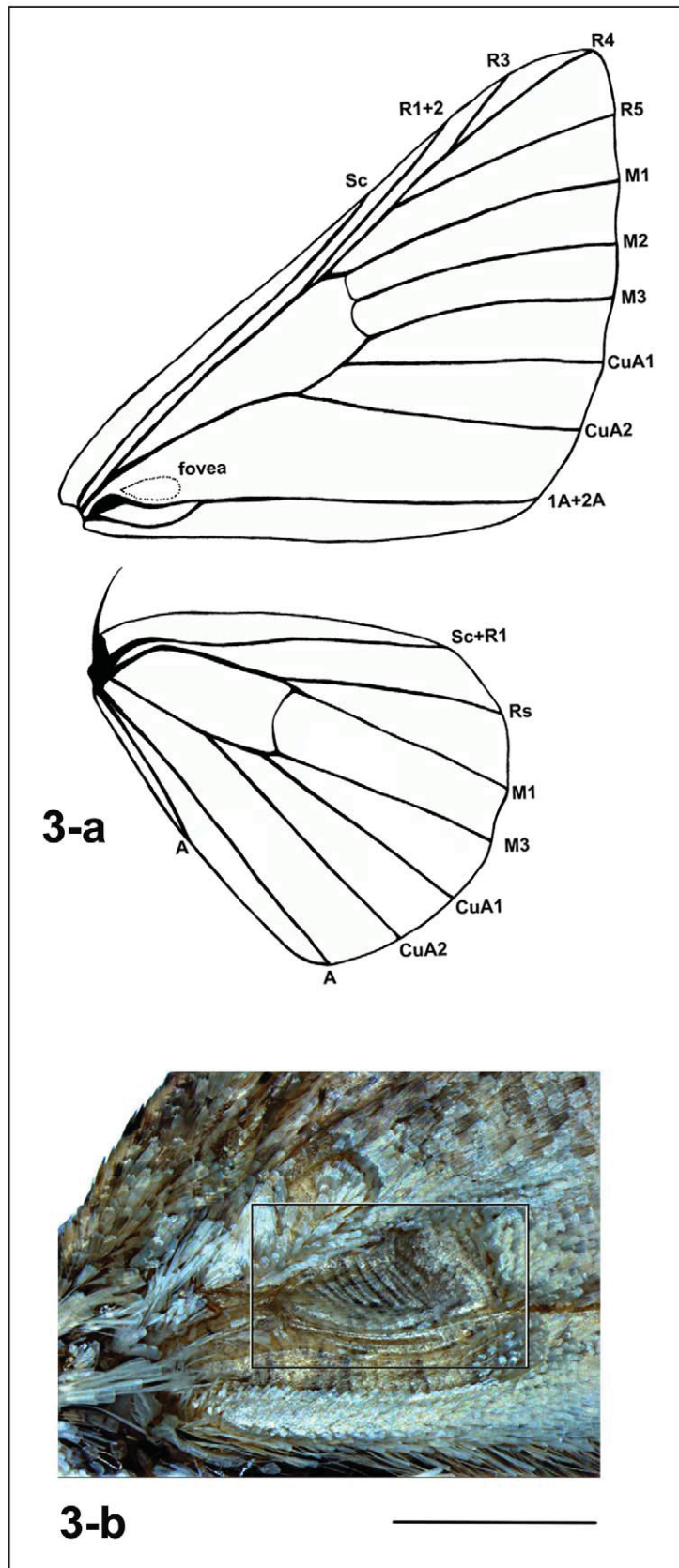


FIGURE 3. 3-a, wing venation and position of fovea; 3-b, structure of fovea (under side view, scale bar: 1 mm) (*G. colchidaria objectaria*, male).

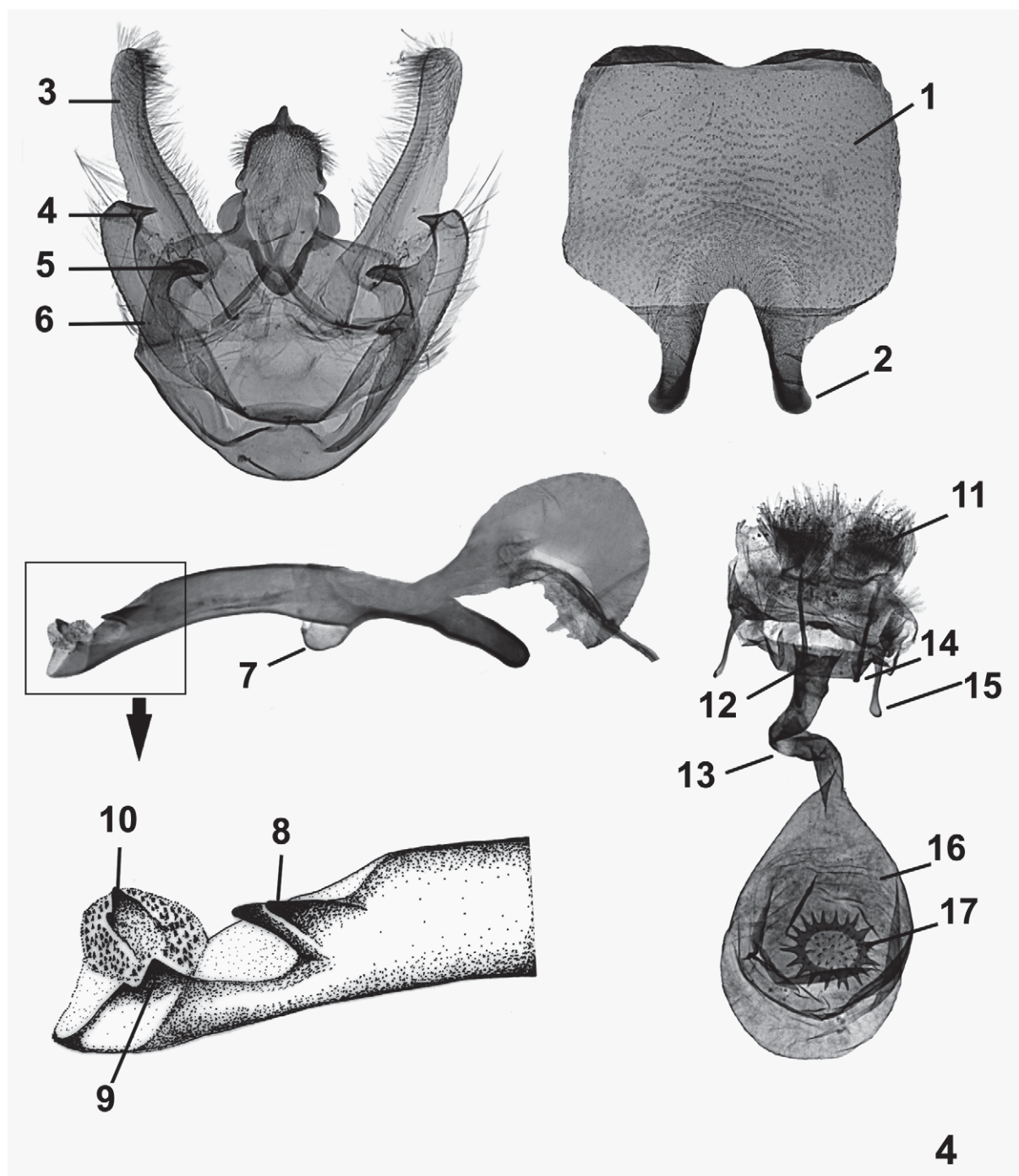


FIGURE 4. Male and female genitalia, male abdominal structures: 1: sternite A8; 2: octavals; 3: dorsal arm of valva; 4: distal projection of sacculus; 5: proximal projection of sacculus; 6: ventral part of valva (sacculus); 7: ventral fin of aedeagus; 8: proximal subapical spines of aedeagus; 9: distal subapical spines; 10: fused cornuti on partly everted vesica; 11: papillae analis (with floricomous setae); 12: antrum; 13: ductus bursae; 14: posterior apophyses; 15: anterior apophyses; 16: corpus bursae; 17: signum (male and female: *G. objectaria sinesefida*).

Species Accounts

Gnopharmia colchidaria (Lederer, 1870)

Gnopharmia colchidaria colchidaria (Lederer)

(Figs 5, 6, 7, 37 & 46; Map 1A, 1B)

Gnophos colchidaria Lederer, 1870: 48, pl. 2, fig. 1. Holotype ♀, coll. Staudinger, MNHU (examined). Type locality: Helenendorf [Göygöl, (Geugoel), West Azerbaijan], SE Caucasus (but see “Taxonomic note”).

Gnopharmia colchidaria colchidaria: Staudinger, 1892: 181; Staudinger, 1901: 343; Prout, 1915: 384, pl. 22a; Wehrli, 1953: 565; Parsons et al., 1999: 406.

Gnopharmia colchidaria melanotaenia Wehrli, 1938: 433, **syn. nov.**

Syntypes 8 ♂, 9 ♀, coll. ZISP, ZFMK (examined). Type locality: Migry (=Meghri) and Dzhuga [distr. Dzhulfa], Arax river, Armenia, S. Caucasus. **Lectotype ♂ designated here.**

Gnopharmia colchidaria melanotaenia: Wehrli, 1953: 565, pl. 47d; Parsons et al., 1999: 406.

Type material examined. Holotype ♀ of *colchidaria*, ‘Helenendorf’ [Göygöl, West Azerbaijan] [1870], ‘Origin’, ‘*colchidaria*’, ‘GloblnG specimen ID: 0021’, ‘gen. prep. 408/2009 H. R.’, ‘*G. colchidaria* (Lederer, 1870) | det. H. R., 2009’; in coll. Staudinger in MNHU. Lectotype ♂ of *melanotaenia*, (examined, hereby designated in order to stabilize nomenclature): ‘18 | 46’, ‘Migry, | Armenia | 6.VII.1931’ [= Meghri, prov. Syunik, Armenia, close to the Iranian border], ‘*Gnopharmia colchidaria* det. Rjabov, ♂, Type’, ‘*Gnopharmia colchidaria melanotaenia* Wehrli, ♂, Holotype’, ‘gen. prep. 415/2008 H. R.’, ‘*G. colchidaria* (Lederer, 1870) | det. H. R., 2009’ [specimen labelled as “holotype” after description by Wehrli]. In coll. ZFMK at present, but will be transferred to ZISP, as announced by Wehrli (1938: 434). Paralectotype ♀, ‘18 | 49’, ‘Migry, | Armenia | 6.VII.1931’, ‘*Gnopharmia colchidaria melanotaenia* Wehrli, ♀, Allotype’, ‘gen. prep. 416/2008 H. R.’, ‘*G. colchidaria* (Lederer, 1870) | det. H. R., 2009’, [specimen labelled subsequently as “Allotype” by Wehrli]. In coll. ZFMK at present, but will also be transferred to ZISP. Further paralectotypes: 6 ♂, 8 ♀, Russ. Armenien, Migry, 6.VII., 8.VII. [1]931, leg. M. Rjabov, ♂ gen. preps 911, 924 & 925, SEM preparation nos 16 & 17, ♀ gen. preps 887, 888 & 889, SEM preparation nos 18 & 33/2010 H. R., Wehrli gen. prep. no. 7218; 1 ♂, Transkauk., fl. Arax, distr. Dzhulfa, pr. Dzhuga, 27.VI.32, M. Rjabov, Wehrli gen. prep. no. 7222; in coll. ZFMK and ZISP (1 ♂, 1 ♀). Additional material studied: 38 ♂, 13 ♀ (see appendix).

Description. Wings and body (Figs 5–7). Frons moderately extended, distally rounded, with a weak central protrusion. Genae antero-ventrally with an acute process. Free apical flagellomeres in male antennae 12. Spine of fore tibia short (fig. 2c), triangular, without acute tip. Wingspan 24–26 mm, ground colour of wings light brown. Forewing with antemedial, medial and postmedial line represented by a few brown spots, most conspicuous those on costa. Postmedial incurved in the middle, sometimes the spots connected by a narrow, orange line. Space between postmedial and the light, strongly dentate submarginal line coloured dark grey, forming a distinct band. Marginal area often like medial and basal area, but more often darker, being strongly striated dark grey. Always a light apical patch present. Hindwings with two transverse lines only, also represented by a few dots, the basal one sometimes as a short, continuous line. Submarginal area like in fore wings. Under side with basal two thirds greyish-white and a well-bordered dark grey submarginal band in which the pale creamy forewing apical spot is clearly visible. Discal dots large and clear on under side, but also conspicuous on upperside. Variation. Frequently darkened specimens occur which are transitional to the extremely dark female holotype (fig. 5). The two specimens mentioned by Wehrli (1953: 565) have the hindwings completely dusted with grey, but the forewings still show remnants of the lighter ground colour (fig. 7b). Other specimens (e.g. two males from Khosrov reserve, Armenia, Sept. 1997) also have the forewings heavily dusted with grey and three females of the same locality are completely dark grey, like or even somewhat darker than the female holotype. Also reddish specimens may occur, resembling *G. rubraria* (fig. 7c; three males, Armenia, Negram and Darasham). Male genitalia and pre-genital abdomen (fig. 37). Proximal tooth-like projections of sacculus larger than distal ones. Aedeagus long (1.4–1.8 mm), with a small ventral fin almost at middle (i.e. coecum penis very long). Distal subapical spines absent, proximal subapical spines present, arranged in a curved row, consisting of 2–3 (rarely up to 5) cone-shaped spines, increasing in size towards apex (maximum length 0.15 mm). Cornuti on the vesica minute, 2–3 basally fused, very small spines. Sternite A8 with octavals long (0.4–0.5 mm) and slender.

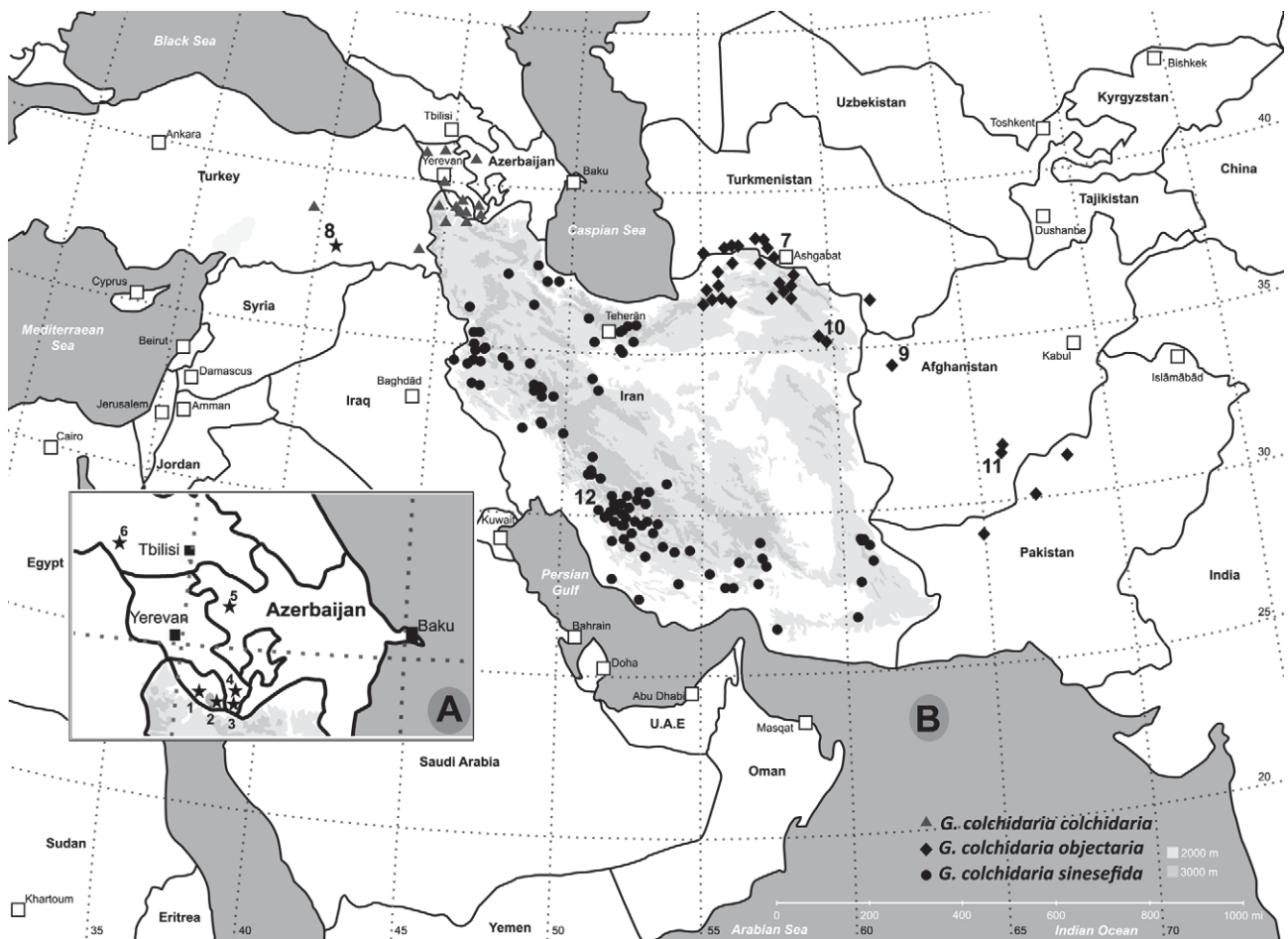
Diagnosis. As described above, *G. colchidaria colchidaria* is a very variable subspecies and may be easily mistaken with other subspecies or species of the genus, recognizing external appearance only. Geographical distribution gives a good hint for the start, as *c. colchidaria* is the only (sub-) species known to occur in S. Caucasus region. However, it also occurs in E. Turkey and NW. Iran, approaching the areas of other taxa like *G. rubraria* and that of its own subspecies *G. colchidaria sinesefida*. Moreover, *G. irakensis* is known to be a very widespread species which also has been found in E. Turkey and may be found in S. Caucasus. The male genitalia provide useful characters to distinguish these species and subspecies. *G. colchidaria sinesefida* whose range of distribution also reaches NW. Iran (see map 1), shares some characters with *c. colchidaria* (e.g. size and shape of aedeagus and general form of valva and its ornamentations). Diagnostic characters to distinguish both are: more broadly rounded sacculus (rather narrow in *c. sinesefida*), with proximal tooth-like projection narrow and sharply pointed (rather stout and rounded in *c. sinesefida*); proximal subapical spines of aedeagus are arranged in a curved row reaching from ventral side of aedeagus up to dorsal side (a straight row situated more dorsally in *c. sinesefida*); distal subapical spines absent (at least one spine present in *c. sinesefida*); cornuti 2–3 very small, basally fused spines (a rather large group of 3–4 composite spines in *c. sinesefida*) (figs 36-c, 37-c). Octavals in *G. c. colchidaria* are slightly longer and narrower than those in *G. c. sinesefida* (figs 36-d, 37-d).

G. kasrunensis and *G. irakensis* are easily distinguished by the very long proximal subapical spines in both species (short, cone-shaped in *G. c. colchidaria*), the extremely broad sacculus in *irakensis* (fig. 39-a), with tooth-like projections differing strongly in size (distal one reduced), the small, tooth-like projections of the same size in *kasrunensis* (fig. 41-a). In *irakensis* the ventral fin of the aedeagus is absent (fig. 39) (present in *colchidaria* and all other species). The octavals are more rounded at the tip and not curved (strongly curved in *kasrunensis*; fig. 41-d). Differential characters to *G. rubraria* see under the latter species. Barcoding results indicate that the taxa *colchidaria* (+ *melanotaenia*), *sinesefida* and *objectaria* (+ *degeneraria*) are conspecific (maximum pairwise distances less than 1.1%) and we treat them here as subspecies of one species, *colchidaria* Lederer. But according to their differences in morphology, geographic distribution and biology (as far as known), they are rather well separated. They could also be considered as sister-species or species ‘in statu nascendi’ which have not yet been isolated for sufficient time to be significantly diverged at the CO1 gene. Especially *G. colchidaria colchidaria* is separated from the other two subspecies by a number of rather distinctive characters (shape of frons, short tibial spines (fig. 2-c), arrangement of proximal subapical spines on aedeagus, geographical range and different food plant) which, at an earlier state of this paper and without having obtained the barcoding results, led us to treat *colchidaria* as a distinct species.

Taxonomic notes. The description of *G. colchidaria* (Lederer, 1870) was based on one female specimen only, the type locality stated as “Achalziche”. Already Staudinger (1892: 181) mentioned that this type, which he received together with the whole Lederer collection, was labelled “Helenendorf” (in Lederers handwriting). Achalziche (Achalzich, Akhalzikhe) is situated in SW Georgia, “Helenendorf” (renamed Khanlar or Hanlar in 1938 and again in 2008 to the present Göygöl or Geugoel) (Zolotuhin, Oct. 2011 in litt.) in Azerbaijan, far away from each other. However, both localities are mentioned frequently in the paper of Lederer and probably he just confounded them. The very detailed description in French (the short Latin one is rough) agrees exactly with the type specimen which also Wehrli (1953: 565) studied and accepted as such. The female holotype is a dark, almost melanic specimen with only a few pattern elements left on upperside (see fig. 5). Males have not been collected together with the female holotype, but we examined various populations from Azerbaijan, Armenia (including the type material of “ssp.” *melanotaenia* Wehrli) and the northwestern border of Iran, which all showed high similarity (e.g. arrangement of the subapical spines of the aedeagus, length and shape of the octavals of sternite A8). Finally, it appeared most likely to us that the “ssp.” *melanotaenia* Wehrli represents the “normal” or most common appearance of the species *colchidaria*, with females predominantly very similar to males. However, there are two females from the type locality of *melanotaenia*—already mentioned by Wehrli, i. c.—which are transitional to the melanic female holotype and another three females from Khosrov, Armenia which are even darker and almost unicolorous.

Life history and habitat. The biology of *G. colchidaria colchidaria* is unknown. In the light of the fact that *G. colchidaria sinesefida* from Iran has been found to be monophagous on *Prunus* (*Amygdalus*) *scoparia* (Rajaei 2010, as ‘*colchidaria*’), and the distribution of *G. c. colchidaria* is highly congruent with the distribution of *Prunus* (*Amygdalus*) *fenzliana* Fritsch (Rosaceae; cf. Browicz & Zieniński 1984), we assume the latter may be the host plant. *G. c. colchidaria* has been collected on 24th of May (Elazig, Turkey) as the earliest and on 13th of September (Khosrov reserve, Armenia) as the latest.

Distribution (Map 1A). The nominate subspecies of *G. colchidaria* is distributed in Armenia, Azerbaijan, East Turkey (new record) and also along the north-western border of Iran. Records of elevation are between 200 and 2400 m a.s.l.



MAP1. Distribution patterns of *G. colchidaria colchidaria*, *G. c. objectaria* and *G. c. sinesefida*

A. Map section (S. Caucasus): 1. Dzhuga [Dzhulfa]; 2. Ordubad; 3. Meghri (Migri, Megri) (type locality of *G. colchidaria melanotaenia*); 4. Goris; 5. Helenendorf (Göygöl), W Azerbaijan (type locality of *G. colchidaria*); 6. Achalziche (type locality of *G. colchidaria* according to Lederer, 1870: 39)

B. Map: 7. Ashkhabad, Akhal-Tekke region (type locality of *G. colchidaria* var. *objectaria* and *G. colchidaria* var. *degeneraria*); 8. Mardin (locality of the female paralectotype of *G. colchidaria* var. *objectaria*); 9. Herat (type locality of *G. inermis*); 10. Jussufabad (type locality of *G. inermis vartianae* and *G. maculifera kasyi*); 11. Arghandab river (type locality of *G. eberti*); 12. Sine Sefid, Fars, S. Iran (type locality of *G. sinesefida*).

***Gnopharmia colchidaria sinesefida* Wehrli, stat. nov.**

(Figs. 25, 26 & 36; Map 1B)

Gnopharmia sinesefida Wehrli, 1941: 880. Syntypes 4 ♂, 2 ♀, in coll Brandt, Naturhistoriska Riksmuseet, Stockholm (examined), 1 ♂, 1 ♀ in ZFMK (examined). Type locality: Fort Sine-Sefid, Süd-Iran, Fars.

Gnopharmia sinesefida: Wehrli, 1953: 567; Parsons et al., 1999: 406.

Gnopharmia colchidaria: Rajaei, 2010.

Type material examined. Syntypes 1 ♂, 'Iran Fars | Straße Chiraz-Kazeroun | Fort Sine-Sefid | ca. 2200 m, 4.5.1937 | coll. Brandt', '*sinesefida* Wehrli *Gnopharmia* Dr. Wehrli, ♂ Type', '*G. colchidaria sinesefida* Wehrli, 1941, stat. nov. | det. H. R., 2009'; 1 ♀, same locality, 2.–4.5.1937, '*sinesefida* Wehrli *Gnopharmia* Dr. Wehrli, ♀ Type'; gen. preps ♂ 414, ♀ 413/2008 H. R.; in ZFMK. Further topotypical material: 1 ♂, 'Iran Fars | Straße Chiraz-Kazeroun | Fort Sine-Sefid | ca. 2200 m, 30.4.1937 | coll. Brandt', Wehrli gen. prep. No. 7405, specimen figured in

Seitz Suppl. 4, pl. 47 f (1 ♀, figured on the same plate 47f, erroneously depicted with male antennae, collected at: Iran, Fars, Strasse Ardekan-Talochosroe Comée, 2600 m, VII.1937, coll. Brandt, gen. prep. 899/2009 H. R., in ZFMK); 1 ♂, 'Iran Fars | Straße Chiraz-Kazeroun | Fort Sine-Sefid | ca. 2200 m, 30.4.1937 | coll. Brandt', SEM preparation no. 20/ 2010 H. R. Additional material studied: 481 ♂, 330 ♀, see appendix.

Description. Wings and body (Figs 25 & 26). Frons strongly conical, with a separate central protrusion set into a distal depression. Genae antero-ventrally with an acute process. Free apical flagellomeres in male antennae 12. Fore tibia with a rather long, acute spine (fig. 2-d), but length a little variable even in specimens from same locality. Wingspan highly variable: 21–30 mm. Ground colour of wings varies from light yellowish brown to light sand-coloured and sometimes to dark brown. A majority of specimens has the basal 2/3 of the wings lighter than the broad, dark greyish-brown distal band, reaching from the margin to the postmedial line, but often separated longitudinally into a lighter distal and a darker proximal half by an indistinct submarginal zigzag-line (which may be absent, however). Antemedial, medial and postmedial lines replaced by indistinct grey or brown dots, those on costa not much clearer. Apical patch rarely visible on upperside of forewings, discal dots small, black. Under side also variable, in most specimens with basal 2/3 whitish, with a well contrasting dark brown marginal band, containing a white apical patch; others have the basal part suffused with light brown and the marginal band reduced or almost absent. Discal dots clear, black. Male genitalia and pre-genital abdomen (Fig. 36). Aedeagus long, slightly curved, with long coecum penis and a small ventral fin; with one, two or three short, proximal subapical spines of different size (the most distal one always the largest or the only one, if the other two are reduced), arranged dorso-laterally as a straight row. Also one short, conical, often strong distal subapical spine present, both groups of spines rather close to each other. A rather large, compound cornutus (two, three or more short spines of different size fused basally) present. Other genitalia characters highly similar to *G. c. colchidaria* (see diagnosis).

Diagnosis. To distinguish *G. c. sinesefida* and *G. c. colchidaria* see the diagnosis of the nominate subspecies. Both subspecies are geographically well separated (see map 1B), only approaching each other in the north-western part of Iran. But in many parts of its geographical area of distribution, *G. c. sinesefida* occurs sympatrically with *G. kasrunensis* and *G. irakensis*. Both species have also been collected together with the type series of *sinesefida*. Externally, *irakensis* may be very similar to *sinesefida*, mainly to specimens with darker ground colour, distinct pattern and clear dark marginal band on under side. Both can be distinguished by the longer unpectinated distal part of the antennae in males (12 segments in *sinesefida*, 18 segments in *irakensis*). Males and females of *irakensis* have a moderately extended frons, rounded distally, whereas *sinesefida* has a strongly extended frons with a round additional process set into a distal depression. To see this clearly, the frons sometimes has to be a least partly de-scaled. *G. kasrunensis* is distinguished by its mostly greyish-white ground colour and the distinct dark grey spots replacing the transverse lines. Moreover, as already described by Wehrli (1953: 567) the proximal margins of the dark marginal bands on the under side of both wings are curving into the tornus and are not, as in other species, continued to the hind margin (but not always). Dark specimens of *kasrunensis*, however, may be mistaken as *sinesefida*, as also antennae and shape of frons are the same. Characters of the male genitalia can help to determine the species correctly: males of *irakensis* have a very broad sacculus with tooth-like processes of which the distal one is strongly reduced in size. The dorsal arm of the valva is narrow. The long aedeagus has no ventral fin and the (proximal) subapical spines are arranged in a dense group of longer and shorter ones, diverging from a common base and arising latero-ventrally on right side. Distal subapical spines are absent, the cornutus on vesica is very small (fig. 39-c). In *kasrunensis*, sacculus and dorsal arms are shaped as in *sinesefida* and all other species (except *irakensis*), the aedeagus is short and stout, the ventral fin is present, the 2–6 (proximal) subapical spines are of different size, 1–2 very long, curved, the others shorter, decreasing in size, the group arranged dorso-laterally. Distal subapical spines absent, a large compound cornutus present on vesica (fig. 41-c). Genitalia characters of *sinesefida* see above. Barcoding results indicate that *sinesefida* is conspecific with *colchidaria* (genetic distance 0.22%).

Taxonomic notes. Wehrli (1941) described this taxon as a separate species, based on a series of five males and three females from “Fort Sine Sefid” (South Iran, Fars, vicinity of Mt. Dena, Central Zagros Mts.). He characterized it as “the largest of all *Gnopharmia* species” and gave a detailed description of specimens more or less looking like the male syntype figured (fig. 25). More topotypical material in the ZFMK collection (not mentioned by Wehrli, perhaps achieved later) shows, that at the same time also much smaller, but otherwise similar specimens have been collected. Specimens collected later in the year (July, September) at the type locality have a quite different appearance and the ample material collected later by other collectors show a wide range of variation

in size, ground colour and the presence or absence of dark marginal bands on under side (see figs 25 & 26). Comprehensive studies of a high number of genitalia preparations from different localities revealed that all of these belong to the same taxon. Also results of barcoding studies confirmed this, and they confirmed also that *sinesefida* is conspecific with *colchidaria* and *objectaria*. The high variability may be explained as geographic variations in this huge range of distribution, as seasonal differences or even adaptations to certain habitats (e.g. calcareous rocks), or as a combination of all. But this is speculative at the moment and has to be investigated more thoroughly in the country.

Life history and habitat. Larval stages and biology of *sinesefida* have been described by Rajaei (2010; as *G. colchidaria*). Host plant: *Prunus (Amygdalus) scoparia* (Rosaceae). This subspecies has more than one generation, most probably two, but perhaps even three, judged from collecting data and different appearances at different times. But it was not possible to separate the generations clearly. The earliest record was on the 7th March (specimens from Hormozgan, South Iran, altitude 850 m a.s.l.). The majority of the material has been collected during May, June and July, and the latest record is from 26th October (Lar in South Iran, at an altitude of 830 m a.s.l.).

Distribution (Map 1). Populations of this subspecies occur nearly in the whole Zagros Mts. in South, West and Northwest Iran, also in the western part of Alborz Mts. in N. Iran. The subspecies is observed in a wide range of altitudes from sea level up to about 3000 m a.s.l.

***G. colchidaria objectaria* Staudinger stat. rev.**

(Figs. 18–24 & 35; Map 1)

Gnopharmia colchidaria var. *objectaria* Staudinger, 1892: 181. Syntypes: 1 ♂, 1 ♀, coll. MNHU (examined). Type locality: (♂) Akhal-Tekke region, Ashkhabad (Turkmenistan), (♀) Mardin (Turkey) (= *irakensis* Wehrli). **Lectotype ♂ designated here.**

Gnopharmia colchidaria objectaria: Staudinger, 1901: 344; Prout, 1915: 384; Parsons et al., 1999: 406.

Gnopharmia objectaria: Wehrli, 1953: 566, pl. 47e; Viidalepp, 1988: 137.

Gnopharmia objectaria objectaria: Parsons et al., 1999: 406.

Gnopharmia colchidaria var. *degeneraria* Staudinger, 1892: 181. **syn. nov.** Syntypes: 4 ♂, 1 ♀, colls MNHU, ZFMK (examined). Type locality: Ashkhabad (Turkmenistan). **Lectotype ♂ designated here.**

Gnopharmia degeneraria: Viidalepp, 1988: 136.

Gnopharmia objectaria degeneraria: Wehrli, 1953: 567, pl. 47e.

Gnopharmia colchidaria degeneraria: Parsons et al., 1999: 406.

Gnopharmia inermis Wiltshire, 1967: 156, pl. 2, figs 20, 21; pl. 13, fig. 54; pl. 14, fig. 55. **syn. nov.** Holotype ♂, paratypes 3 ♂, 1 ♀, coll. SMNK (examined). Type locality: Herat, Afghanistan.

Gnopharmia inermis: Parsons et al., 1999: 406.

Gnopharmia inermis vartianae Wiltshire, 1970: 389, pl. 1, fig. 4. **syn. nov.** Holotype ♂, Paratype ♀, coll. NHMW (examined). Type locality: Jussufabad, near Mashhad, NE Iran.

Gnopharmia inermis vartianae: Parsons et al., 1999: 406.

Gnopharmia eberti Wiltshire, 1967: 158, pl. 2, fig. 17; pl. 14, fig. 59. **syn. nov.** Holotype ♂, coll. SMNK (examined). Type locality: Arghandab river, 30 km N of Kandahar (SW. Afghanistan).

Gnopharmia eberti: Parsons et al., 1999: 406.

Gnopharmia maculifera kasyi Wiltshire, 1970: 389, pl. 1, fig. 3. **syn. nov.**

Holotype ♂, NHMW (examined). Type locality: Jussufabad, near Mashhad, NE Iran.

Gnopharmia maculifera kasyi: Parsons et al., 1999: 406.

Type material examined. *G. colchidaria* var. *objectaria* Staudinger, 1892, **lectotype** ♂ (hereby designated in order to stabilize nomenclature), [Turkmenistan] ‘Askhabad, “Eyldt” [name of collector, hand-written, not correctly readable], ‘Origin’, ‘764’, ‘GlobInG specimen ID: 0023’, ‘[slide no] GU: 679/2008 R. Trusch’, ‘Lectotype *G. colchidaria objectaria* Staudinger, 1892 | design. here’; in coll. Staudinger in MNHU; paralectotype ♀, Mardin, 88. “Sint.” [1888; name of collector, not correctly readable], ‘Origin.’, ‘[slide no] GU: 680/2008 R. Trusch’, ‘paralectotype *G. colchidaria objectaria* Staudinger, 1892 | det. H. R. 2011’; in coll. Staudinger in MNHU. *G. colchidaria* var. *degeneraria* Staudinger, 1892, **lectotype** ♂ (hereby designated in order to stabilize nomenclature), [Turkmenistan] ‘Askhabad | 89 “Eyl.”’, ‘Origin.’, ‘GlobInG specimen ID: 0022’, ‘gen. prep. 409/2008 H. R.’, ‘Lectotype *G. colchidaria* var. *degeneraria* Staudinger, 1892 | design. here’; in coll. Staudinger in MNHU; paralectotype ♀, [Turkmenistan, Askhabad], ‘Origin’, ‘gen. prep. 410/2008 H. R.’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; in coll. Staudinger in MNHU. Further typical and topotypical

material: paralectotype ♂, [Turkmenistan] ‘*colchidaria* v. *degeneraria* Stgr., ♂, 1896, Askhabad’, ‘*Gnopharmia degeneraria* Stgr., abgebildet Seitz IV. Suppl. fig.’ [pl. 47e, right specimen of the two *degeneraria*], Wehrli gen. prep. no. 5139, *G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; ♀, [Turkmenistan] ‘*Colchidaria* v. *degeneraria* Stgr., ♀, Askhabad’, ‘*Gnopharmia degeneraria* Stgr., abgebildet Seitz IV. Suppl. fig.’ [pl. 47e, left specimen of the two *degeneraria*, erroneously with male antennae], *G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; paralectotype ♂, [Turkmenistan] ‘*colchidaria* v. *degeneraria* Stgr., ♂, Askhabad’, ‘*cocandaria* v. *degeneraria*’, ‘paralectotype *G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’ [abdomen missing]; ♂, Transkasp[ien] Askhabad [Turkmenistan], ‘655’, Wehrli gen. prep. no. 7219, ‘*G. objectaria* Stgr, von ihm erworben’[i.e. purchased from Staudinger]; *Gnopharmia objectaria* Stgr., abgebildet Seitz IV. Suppl. fig. [pl. 47e, right specimen of the two *objectaria*, erroneously labelled as female]; ♀, ‘Askhabad, v. *cocandaria* Stgr,’ [Turkmenistan], *Gnopharmia objectaria* Stgr., abgebildet Seitz IV. Suppl. fig. [pl. 47e, left specimen of the two *objectaria*, erroneously with male antennae and labelled as male]; gen. prep. 883/2009 H. R.; ♂, ‘Tekke’ [Turkmenistan], ‘652’, ‘*G. objectaria* Stgr., von ihm erworben’, paralectotype *G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’, ♀ ‘Tekke’ [Turkmenistan], ‘653’, ‘*G. objectaria* Stgr., von ihm erworben’, ‘paralectotype *G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; all in ZFMK. *Gnopharmia inermis*, Holotype ♂ (examined), ‘Afghanistan | Herat, 970 m | 15.–25.4.1956 | H. G. Amsel leg.’, ‘*Gnopharmia | inermis* Wilts. | Holotype ♂’, ‘gen. prep. 596/2009 H. R.’, in coll SMNK. Paratypes (examined): 1 ♀, ‘Afghanistan | Herat, 970 m | 15.4.1956 | H. G. Amsel leg.’, ‘*Gnopharmia | inermis* Wilts. | Allotype ♀’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; 2 ♂ ‘Afghanistan | Herat, 970 m | 15.4.1956 | H. G. Amsel leg.’, ‘preparation MW. 153’, ‘*Gnopharmia | inermis* Wilts. | Paratype ♂’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; 1 ♂: ‘Afghanistan | Herat, 970 m | 5.5.1956 | H. G. Amsel leg.’, ‘Preparation E.P. 1136’, ‘*Gnopharmia | inermis* Wilts. | Paratype ♂’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; both in SMNK. *Gnopharmia inermis vartianae*, Holotype ♂, ‘23.VI.1963 | NO [NE]-Iran, W v. | Jussufabad | [leg.] Kasy & Vartian’, ‘Preparation WW. 78. ♂’, ‘[a piece of blue paper]’, ‘Nat. Hist. Mus. | Wien | Gen. Praep. | MV 17306’, ‘*Gnopharmia | inermis* Wilts. | ssp. *vartianae* Wilts. | holotype ♂’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; Paratype ♀ (examined), ‘21.VI.1963 | NO [NE]-Iran, | W v. Meshed [Mashhad] | [leg.] Kasy & Vartian’, ‘Preparation WW. 78. ♀’, ‘[a piece of blue paper]’, ‘Nat. Hist. Mus. | Wien | Gen. Praep. | MV 17306’, ‘*Gnopharmia | inermis* Wilts. | ssp. *vartianae* Wilts. | allotype ♀’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; both in NHMW. *Gnopharmia eberti*, Holotype ♂ ‘SW. Afghanistan | Fluß Arghandab 30 | km nördl. Kandahar | 1150 m | 23.V.1957 | leg. G. Ebert’, ‘Preparation WM. 110 [E. P. Wiltshire]’, ‘*Gnopharmia | eberti* Wilts. ♂ | Holotype’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; in SMNK. *Gnopharmia maculifera kasyi*, Holotype ♂, ‘23.VI.1963 | NO [NE]-Iran, W v. | Jussufabad | [leg.] Kasy & Vartian’, ‘Preparation WW. 148’, ‘Nat. Hist. Mus. | Wien | Gen. Praep. | MV 17305’, ‘Holotypus | *Gnopharmia | maculifera* Stgr. | ssp. *kasyi* Wilts.’, ‘*G. colchidaria objectaria* Staudinger, 1892 | det. H. R., 2009’; in NHMW. Additional material studied: 93 ♂, 15 ♀, see appendix.

Description. Wings and body (Figs 18–24). Frons strongly extended, with a separate protrusion set into a distal depression. Genae distinctly pointed antero-ventrally. Free apical flagellomeres in male antennae 12. Wingspan 24–28 mm. Tibial spines long and acute. Wings on upperside light grey, sand-coloured, dusted with brown scales, transverse lines replaced by a few rather indistinct dark brown spots, most conspicuous those along costa. Postmedial row of dots more numerous, incurved in the middle; a broad, dark grey marginal band present, apical patch as ground colour, rather indistinct. Discal dots blackish brown, fairly visible on all wings. Under side with basal two thirds almost white, scattered with a few black scales, marginal band well contrasting, dark grey, including a white apical patch, discal dots large, almost black (*colchidaria objectaria*, fig. 18-b). Variation. Even more abundant than the nominate form is a more or less uniform, dark grey infrasubspecific form with reduced pattern elements, described as var. *degeneraria* (of *colchidaria*) by Staudinger (1892: 183) (fig. 19) in which also the under side is strongly suffused with brown or grey scales, the marginal band being only slightly darker, not well contrasting. In this form, the apical patches are almost absent, the discal dots are weak. Transitional forms occur, also rarely specimens with a reddish-brown pattern on upperside. *G. inermis* Wiltshire is such a brownish form (fig. 20), while *G. inermis vartianae* (figs 21 & 22) is transitional between *objectaria* and *degeneraria*. *G. eberti* (fig. 23) and *G. maculifera kasyi* (fig. 24) are, on the other hand, rather typical *objectaria*. Male genitalia and pre-genital abdomen (Fig. 35). Distal projection of sacculus slightly shorter than proximal one. Aedeagus long (1.3–1.5 mm), with a long coecum penis and a small ventral fin, situated almost in the middle of the shaft. Distal subapical spines

present, very small, tooth-like, single or arranged in a row of 2–3, rarely more (fig. 35-b). Proximal subapical spines variable, rarely completely absent, mostly a single small spine only, but sometimes larger, rarely even two spines. Distal and proximal subapical spines placed at a rather large distance from each other. Vesica with a small, multiple cornutus. Octavals short (0.25–0.4 mm), with a wide opening between them (fig. 35-d).

Diagnosis. *G. colchidaria objectaria* is a highly variable subspecies (as the other two are). Generally, the typical *objectaria* has a light greyish-white ground colour and also in the form *degeneraria*, ground colour is rather grey than brown, but not always. Shape of frons and antennae are similar to those of *sinesefida*, but differences in male genitalia may help separating both: arrangement and size of subapical spines are different, *sinesefida* has a large, compound cornutus (small in *objectaria*); octavals in *G. c. sinesefida* are longer, with a narrower opening between them (figs 35 & 36). Moreover, the areas of distribution of both subspecies are well separated (see map 1). *G. irakensis* and *G. kasrunensis* may occur in the same area together with *G. c. objectaria*, however, but both can be clearly separated from *objectaria* by characters of head (frons, antennae), octavals and genitalia (see diagnosis of *sinesefida*). The closely related species *G. cocandaria* Erschoff has not been found close to the range of *objectaria* (diagnostic characters see under *cocandaria*). Barcoding results clearly indicate that *objectaria* is conspecific with *sinesefida* and *colchidaria* (genetic distance about 1%), but not with *cocandaria* Erschoff (see fig. 54).

Taxonomic notes. *G. colchidaria* var. *objectaria* was described by Staudinger (1892: 181–183) as a geographic variation (i.e. a subspecies of *colchidaria*), based on one male specimen from “Tekke” (= Akhal-Tekke) or Ashkhabad, Turkmenistan. He added a female from Mardin (Turkey) to the types because of its very similar appearance, mainly of the under side with white base and black marginal bands. After closer examination (frons not extended, spine of foreleg tibia absent) this turned out to be a female of *G. irakensis* Wehrli. A very similar male, also from the Akhal-Tekke-region, had been published and figured by Christoph (1885: 121, pl. 6, fig. 2a, b) before, but he determined it as *Boarmia cocandaria* Erschoff. Staudinger, who did not agree with him, described this as var. *objectaria* of *G. colchidaria* (which also shows this contrasting under side), including the specimens figured by Christoph. Wehrli (1953: 566) considered *objectaria* to be different from *colchidaria* and raised it to species rank. He based this opinion on the different shape of the frons, the male genitalia and the shape of the octavals. DNA barcoding results, however, indicate that *objectaria* is conspecific with *colchidaria* and should be treated as a geographically as well as morphologically well separated subspecies, with *G. colchidaria* var. *degeneraria* Staudinger (1892: 183) being just a uniformly coloured, darker grey infrasubspecific form. The latter seems to be even more abundant, at least at the Akhal-Tekke-region. Wiltshire (1967, 1970) described further new species and subspecies from NE. Iran and Afghanistan which are synonymised here with *G. c. objectaria*. These are (1): *Gnopharmia inermis* Wiltshire, 1967, from Herat, W. Afghanistan (fig. 20): described by Wiltshire as “resembles best the *degeneraria* Stgr. forms from Ashkhabad, but differs in being even less marked, and also genitaliter”. The latter he describes as “without exterior thorn”. Without “exterior thorn” (= without proximal subapical spines) or with a small spine (a condition we found in the genitalia of the holotype of *inermis*) is the most abundant condition in the genitalia of *G. c. objectaria*. Appearance of *inermis* indeed falls within the range of variation of the *degeneraria* Stgr. forms, as Wiltshire mentioned in the description. The type locality Herat is situated rather near to the centre of distribution of *G. c. objectaria*. Therefore we synonymise *Gnopharmia inermis* Wiltshire, 1967, with *Gnopharmia colchidaria objectaria* Staudinger, 1892. (2): *Gnopharmia inermis vartianae* Wiltshire, 1970, from Jussufabad, NE Iran (figs 21 & 22): Type locality close to that of *inermis inermis*, but in Eastern Iran. Type specimens are even more looking like typical *G. c. objectaria*, with a contrasting dark marginal band on under side, upperside suffused with grey (a transitional form between *objectaria* and *degeneraria*). Genital structures are said to be (Wiltshire, 1970: 389) the same as in *inermis*, therefore we synonymise *Gnopharmia inermis vartianae* Wiltshire, 1970 with *Gnopharmia colchidaria objectaria* Staudinger, 1892. (3): *Gnopharmia eberti* Wiltshire, 1967 from Arghandab River, 50km from Kandahar, “South-west “Afghanistan (rather South-east Afghanistan, see map 1). The description was based on one, rather worn male specimen, the holotype (examined). Externally, it resembles typical *objectaria* on upper- and under side, genitalia are described as “aedeagus without large exterior thorns or even conical smaller thorns; instead, the right side has a few distal scobinations, widely spaced, distally on the sclerotized sheath”. This (and other characters mentioned in the description) perfectly agrees with an abundant condition of the genitalia of *objectaria*. Wiltshire (1970: 390) subsequently –invalidly– designated a female allotype and 29 male and female paratypes. Ebert (1965: 19, 21–22) already mentioned this material (11 males, 21 females from Arghandab river, 30 km northern of Kandahar, 1100 m, 23./24.v. 1957, leg. G. Ebert) as “*Gnopharmia objectaria* Staudinger ssp.?” He also described the appearance of this material and the

variability of the male genitalia characters (which exactly describes the variability of the *objectaria* male genitalia we also found). According to circumstances unknown to us, Wiltshire (1967) described this material as *G. eberti*, but based it on one male only. He later (1970) added the rest of the material, as mentioned above. We here synonymise *Gnopharmia eberti* Wiltshire, 1967 with *Gnopharmia colchidaria objectaria* Staudinger, 1892. (4): *Gnopharmia maculifera kasyi* Wiltshire, 1970, from Jussufabad, NE Iran. Type locality and time of collecting are the same as those of *inermis vartianae*. Indeed, the single specimen (holotype) of *kasyi* is very similar to the latter, just without the grey suffusion and thus exactly agreeing with typical *objectaria*. Also the aedeagus, with two small proximal subapical spines and two very small, tooth-like distal subapical spines, with a wide gap between both groups, and the small, multiple cornutus is typical for *objectaria*. Therefore, we here synonymise *Gnopharmia maculifera kasyi* Wiltshire, 1970, with *Gnopharmia colchidaria objectaria* Staudinger, 1892.

Life history and habitat. (Fig. 50). According to the ample material studied here, the flight period starts at mid-April (Afghanistan, Herat, 970 m) and lasts until end of August. Specimens are attracted to light and it seems that the species is exclusively night-active. Further early records are from Golestan (North Iran, Moghadam, 8th May, altitude 1150 m). The latest record is the 26th August at an altitude of 1300 m (Shahrud, North Iran). The larva was reared by H. R. on *Prunus* (*Amygdalus*) *scoparia* and *Prunus* (*Amygdalus*) *spinosissima* (Rosaceae), two species of “Bitter Almonds” occurring, for example, on the northern and southern slopes of the Kopet-Dagh mountains.

Distribution (Map 1). North and Northeast of Iran to South Turkmenistan, Tajikistan, East and South of Afghanistan and Pakistan (new records for Pakistan). It is collected at altitudes between 400 m and 2500 m a.s.l.

Gnopharmia cocandaria (Erschoff) stat. rev.

Gnopharmia cocandaria cocandaria (Erschoff)

(Figs 8, 9, 10, 11 & 42; Map 2)

Boarmia cocandaria Erschoff, 1874, p. 65, pl. 4, fig. 63. Holotype ♂ (by monotypy), ZMMU (examined). Type locality: Soch near Kokand [E. Uzbekistan].

Gnopharmia colchidaria cocandaria: Staudinger, 1901: 343; Prout, 1915: 384; Wehrli, 1953: 566, pl. 47e; Parsons et al., 1999: 406.

Gnopharmia maculifera Staudinger, 1892, p. 187, pl. 2, fig. 13. **syn. nov.** Syntypes 4 ♂ 1 ♀, coll. Staudinger, MNHU (examined). Type locality: Samarkand, Uzbekistan.

Gnopharmia maculifera: Staudinger, 1901: 344; Prout, 1915: 384; Wehrli, 1953: 567; Viidalepp, 1988: 137.

Gnopharmia maculifera maculifera: Parsons et al., 1999: 406.

Gnopharmia rubraria var. *subrubraria* Staudinger, 1892, p. 184, pl. 2, fig. 12. **syn. nov.**

Syntypes 4 ♂, 3 ♀, coll. Staudinger, MNHU (examined). Type locality: Alai Mts., Namangan, Kara Sagin (E.Uzbekistan) (Fig. 26).

Gnopharmia rubraria var. *subrubraria*: Staudinger, 1901: 344; Prout, 1915: 384; Wehrli, 1953: 568; Parsons et al., 1999: 406.

Gnopharmia subrubraria: Viidalepp, 1988: 138.

Type material examined. *Boarmia cocandaria*, holotype ♂, “Turkestan, Kokand, Weg nach Ochna, Dorf Sokh, 30.VI 1871, A.P. Fedtschenko leg.” (examined, see fig. 8), in ZMMU. *Gnopharmia maculifera*, **Lectotype** ♂ (examined, hereby designated in order to stabilize nomenclature), [Central Asia, Uzbekistan, Samarkand, 1892]’, ‘766’, ‘Origin’, ‘gen. prep. 405/2008 H. R.’, ‘Lectotype *Gnopharmia maculifera* Staudinger, 1892 | design. here’, ‘*G. cocandaria* (Erschoff, 1874) | det. H. R., 2009’, in MNHU. Paralectotype ♀ (examined), [Central Asia, Uzbekistan, Samarkand, 1892], ‘Origin’, ‘Genitalia | photographed. | B.M. negative | No: 32697’, ‘Paralectotype *Gnopharmia maculifera* Staudinger, 1892 | det. H. R., 2009’, ‘*G. cocandaria* (Erschoff, 1874) | det. H. R., 2009’, in MNHU. *Gnopharmia rubraria subrubraria*, **Lectotype** ♂ (hereby designated in order to stabilize nomenclature), [Uzbekistan] ‘Alai [Margelan], 95, Hbh.’ [probably: Haberhauer, name of collector], ‘Origin’, ‘Stgr. 108’, ‘var. *subrubraria* Stgr’, ‘GloblnG specimen ID: 0025’, ‘gen. prep. 404/2008 H. R.’, ‘Lectotype *G. rubraria subrubraria* Staudinger, 1892 | design. here’, ‘*G. cocandaria* (Erschoff, 1874) | det. H. R., 2009’ in MNHU.

Paralectotypes: 1 ♂, ‘Margelan, Hbh.’; ,19/6’, ‘Origin’, ‘Paralectotype *G. rubraria subrubraria* Staudinger, 1892 | det. H. R.’; 2 ♂, ‘Origin’, ‘Paralectotype *G. rubraria subrubraria* Staudinger, 1892 | det. H. R.’; in MNHU. The three females from Alai, Namangan and Kara Sagin, mentioned by Staudinger in the original description could not be traced in the MNHU collection. Additional material studied: 32 ♂, 5 ♀, see appendix.

Description. Wings and body (Figs 8–11). Wingspan 24–30 mm. Frons strongly extended, with a separate process set into a distal depression. Genae distinctly pointed antero-ventrally. Free apical flagellomeres in male antennae 12. Tibial spines long and acutely pointed, but generally shorter than in *colchidaria*. The tibia shorter and broader than in *colchidaria*. Wings heavily suffused and striated with dark brown or greyish-brown (holotype, see fig. 8), only remnants of the greyish-white ground colour visible. Transverse lines indicated by a few dark grey spots, postmedial line consisting of narrow streaks on the veins, connected by a yellowish-brown line. Prominent dark spots along costa and a cream-coloured apical patch present. Submarginal band narrow, interrupted at middle, distally bordered by a cream-coloured, dentate submarginal line, terminating with a large, blackish spot on costa. Hindwings with similar coloration, antemedial and medial lines absent. Under side with basal three fourths greyish-white, densely suffused with grey scales. A broad, dark brown marginal band and a whitish apical patch present. Streak-like blackish discal spots clearly visible on under side, indistinct on upperside. Specimens with the appearance of the holotype are obviously rare. Variation. More abundant is a distinctly “maculiferous” form, greyish-white or light cream-coloured, having the transverse lines replaced by prominent brown to grey dots, most conspicuous on costa at antemedial, medial and postmedial position. There is also a submarginal costal spot, belonging to a transverse band which is also rather separated into several separate sections. The light apical patch is often indistinct, but sometimes well contrasting. Hindwings with two transverse rows of spots, the basal often a continuous line. Under side pale cream-coloured or greyish white, strongly suffused with darker scales, dark grey marginal band present, but not very sharply contrasting to the basal two thirds of the wings. Discal dots present on upperside and under side of both wings, dark grey, but small. This form has been described as a distinct species *G. maculifera* Staudinger. Often specimens occur with less distinct dotting of upperside, with strong suffusion by brownish-grey scales, concealing most pattern elements. This form, described as var. *subrubraria* of *G. rubraria* by Staudinger, comes close to the holotype of *cocandaria* on upperside, but lacks the contrasting white and dark brown pattern of the under side (which generally rarely occurs in *cocandaria* specimens). Also very rarely specimens with a reddish tint occur. Male genitalia and pre-genital abdomen (Fig. 42). Sacculus broadly rounded, the tooth-like projections small, proximal one slightly longer than the distal one. Aedeagus short (1.2–1.3 mm), with especially short coecum penis (length about 1/3 of aedeagus), 1–3 distal subapical spines present, but very small, at ventral side of aedeagus, close to the proximal group of 2–3, rarely 4 long subapical spines (> 0.2 mm), inserting laterally on right side. Cornuti on vesica absent. Ventral fin of aedeagus small, its width about 1/2 width of the aedeagus. Octavals short, 0.3–0.4 mm, distally truncate.

Diagnosis. *Maculifera*-form externally similar to *G. kasrunensis*, which also has a greyish-white ground colour and dark grey dots representing the transverse lines rather distinctly, but wings are a little shorter and broader in *kasrunensis* (figs 15 & 16). The aedeagus in *kasrunensis* is also short and bears 2–3 long proximal subapical spines (fig. 41); but in contrast to *cocandaria*, the distal subapical spines are absent; cornuti on vesica are absent in *cocandaria*, but present as a group of large, composite cornuti in *kasrunensis* (fig. 41-b). The ventral fin of the aedeagus is smaller in *cocandaria* but more shallowly rounded in *kasrunensis* (figs 41-b & 42-b). *G. cocandaria* is geographical isolated from the other species (see the Map 2), only the widespread *G. irakensis* might occur in addition, but has not yet been recorded from the geographical range of *cocandaria*. Moreover, it is easily distinguished from *cocandaria* by the rounded frons, 18 apical unpectinated flagellomeres in males and absent tibial spines in both sexes (fig. 2-b). Barcoding results (see fig. 54) have clearly proved that *G. cocandaria* is a distinct species. Genetic distances between *cocandaria* and all other taxa are more than 4%.

Taxonomic notes. 1. Erschoff (1874) described *cocandaria* based on a single male from Soch (or Sokh, near Kokand, East Uzbekistan). Holotype (see fig. 8) in the collection of ZMMU (Antonova, 1981: 219), examined. There is no doubt that the type of *cocandaria* and the other taxa described from the same Central Asian region (*maculifera* Staudinger, *rubraria* var. *subrubraria* Staudinger) all belong to one species, with *cocandaria* being the oldest valid name. However, the identity of this species remained dubious for more than hundred years, even Parsons et al., 1999, still mention it as a subspecies of *G. colchidaria*. The reason probably was the bad figure in the original description of Erschoff which in fact does not resemble the type specimen very much. Moreover, the description was written in Latin and Russian (but the Russian part very detailed and fitting well to the appearance of the type; V. V. Zolotuhin, in litt.). Christoph (1885: 121) was the first who complained about that bad figure, leading him to provide better figures. However, the two specimens he figured (l. c., pl. 6, fig. 2a, 2b) from Achal-Tekke belong to *G. colchidaria objectaria*, as we know today. Staudinger (1892: 182) also recognized the bad original figure of *cocandaria* and, moreover, he could not translate the Russian description. Nevertheless, he

questioned the treatment of Christoph and described these specimens from Achal-Tekke (with under side white and with black marginal band) as var. *objectaria* (of *colchidaria* Lederer). 2. *Gnopharmia maculifera* was described by Staudinger mainly because of the strongly speckled upperside of the wings which he considered to be unique among the known taxa. But he also found the under sides being very similar to those of his var. *subrubraria*, described from the same geographic region, and admitted that *maculifera* also may be just another local form. 3. *G. rubraria* var. *subrubraria* was described by Staudinger as a smaller, less reddish form compared to his *rubraria* from Palestine. Interestingly, he found that two females from Samarkand, tentatively determined as *cocandaria* before, agreed very well with this form. 4. *G. maculifera afghanistana* Wiltshire was described as a subspecies of *maculifera* from Afghanistan, based on one male specimen only. Wiltshire considered *maculifera* as a bona species, having examined the type material at MNHU before.

Life history and habitat. Preimaginal stages and biology unknown. Earliest record May 16 (1300 m, Nuratau-Gebirge, Sarmitan, Uzbekistan). The majority of the material collected is from June and July, latest record August 5 (Parkent, 1400m, Prov. Taschkent, Uzbekistan).

Distribution (Map 2). East-Uzbekistan, West-Tajikistan, Kyrgyzstan. Specimens were found at altitudes between 650 m and 2000 m a.s.l.

***Gnopharmia cocandaria afghanistana* Wiltshire, comb. nov.**

(Fig. 12, Map 2)

Gnopharmia maculifera afghanistana Wiltshire, 1967, p. 157, pl. 2, fig. 16; pl. 14, fig. 58.

Holotype ♂ (by monotypy), SMNK (examined). Type locality: Pul-i-chomri, N. Afghanistan.

Gnopharmia maculifera afghanistana: Parsons et al., 1999: 406.

Type material examined. *Gnopharmia maculifera afghanistana*, Holotype ♂, ‘N Afghanistan | Pul-i-chomri | 28.6.1956 | H. G. Amsel. leg., 700 m’, ‘*Gnopharmia maculifera* Stgr. *afghanistana* Wilts., Holotype’, ‘preparation WM.108’, in SMNK.

Description. The single male specimen (holotype) quite agrees with the ‘*maculifera*’-form of *cocandaria*, though it is smaller and the wings are a little shorter. The specimen is worn. Other external characters and genitalia also agree with those of *cocandaria*. Wiltshire mentions “several slight differences” without indicating them clearly. The under side cell spots are said to be absent, but they are present, though weak (see fig. 12).

Taxonomic note. Wiltshire (1967: 157) admitted that “the differences may be only an individual variation” and “describing the Afghan form as a distinct race....may prove to be illusory”. No further material has been collected from the type locality, so we are still unable to confirm or reject the validity of a separate race *afghanistana*.

Life history and habitat. Preimaginal stages and biology unknown. The holotype has been collected in the end of June, at an elevation of 700 m.

Distribution (Map 2). N. Afghanistan. Only known from the type locality.



MAP 2. Distribution patterns of *G. erema*, *G. kasrunensis* and *G. cocandaria*

1. Kokand, Soch, Uzbekistan (type locality of *G. cocandaria*); 2. Margelan, Alai, Uzbekistan (type locality of *G. rubraria* var. *subrubraria*); 3. Samarkand, Uzbekistan (type locality of *G. maculifera*); 4. Pul-i-chomri, Afghanistan (type locality of *G. maculifera afghanistana*); 5. Kerbela desert, Iraq (type locality of *G. erema*); 6. Kunar Takteh, Iran (type locality of *G. kasrunensis*).

Gnopharmia erema Wehrli

(Figs 13 & 38; Map 2)

Gnopharmia erema Wehrli, 1939: 71. Syntypes 2 ♂, BMNH, ZFMK (examined). Type locality: Kerbela desert, Iraq.

Gnopharmia erema: Wehrli, 1953: 566, pl. 47f; Parsons et al., 1999: 406.

Type material examined. Syntype ♂, 'Kerbela desert | 12.4.37', '*Gnopharmia erema* Wehrli, ♂, Holotype [red label, partly handwritten by Wehrli], '*Gnopharmia erema* Wehrli Stgr., abgebildet Seitz IV. Suppl. fig.' [yellow label, partly handwritten by Wehrli], 'gen. prep. 411/2008 H. Rajaei.', BC ZFMK Lep 00785 [barcoding serial number], in ZFMK. Syntype ♂, 'Iraq: desert | Kerbela | 1.v.1937 | E. P. Wiltshire', '*erema* | Wehrli *Gnopharmia* | Dr. Wehrli', 'Wehrli genitalia slide no. 7251 ♂, 'Wiltshire coll. | B.M. 1979-433', in BMNH. Additional material studied: 2 ♂, 4 ♀: 1 ♀, same locality as type locality, 11.iv.1937 E. P. Wiltshire, genitalia preparation E. P. Wiltshire 2698, Wiltshire coll. B.M. 1979-433; 1 ♂, same locality, 6.v.1937 E. P. Wiltshire, genitalia preparation E. P. Wiltshire 1104 male, Wiltshire coll. B.M. 1979-433; 1 ♀, same locality, 11.iv.1937 E. P. Wiltshire, genitalia preparation E. P. Wiltshire 1104 female [same slide as male] / Wiltshire coll. B.M. 1979-433; 1 ♂, same locality, 4.v.1937 E. P. Wiltshire, Wiltshire coll. B.M. 1979-433, *Gnopharmia erema* Wli; 1 ♀, same locality, 5.v.1937 E. P. Wiltshire / Wiltshire coll. B.M. 1979-433; 1 ♀, same locality, 11.iv.1937 E. P. Wiltshire / Wiltshire coll. B.M. 1979-433. all in BMNH.

Description. Wings and body (Fig. 13). Frons conically extended, distal depression and central protrusion weak. Genae distinctly pointed antero-ventrally. Free apical segments in male antennae 10. Tibial spines rather long and acute. Wingspan 24 mm (paralectotype in ZFMK measured, but lectotype and additional specimens in BMNH more or less of the same size). Wings on upperside light greyish-brown or sand-coloured, dusted with brown scales, transverse lines replaced by a few rather indistinct dark brown spots, most conspicuous those on costa. An indistinct darker brown submarginal band present, not bordered distally by a dentate line; marginal area as ground colour, margin with black spots or short streaks centrally between the veins, apical patch absent. Fringe unichrome, almost white. Discal dots blackish brown. Hindwings with pattern elements even more reduced, marginal streak more continuous. Under side much lighter than upperside, sand-coloured, shining. Marginal band very faint, hardly visible. Discal dots clearly marked. Male genitalia and pre-genital abdomen (Fig. 38). Aedeagus short (1.2 mm), stout, with a short coecum penis and a small ventral fin; two long and one shorter proximal subapical spines (number and size probably variable. Wehrli (1953: 566) mentions 3–4 larger and some smaller spines) present in a dorso-lateral position on right side, also 1–3 small, tooth-like distal spines ventrally near the tip of the aedeagus. Cornuti on vesica absent. Octavals short (0.3 mm), broad, with rounded tip.

Diagnosis. In some characters, e.g. shape of aedeagus and length and arrangement of proximal subapical spines, this species is very similar to *G. kasrunensis* (fig. 41) and *G. cocandaria* (fig. 42). In *cocandaria*, the aedeagus is longer and narrower, *kasrunensis* has a larger, but also stout aedeagus, but the proximal spines are longer, the distal spines are absent and a large, multiple cornutus is present (the latter absent in *erema*). The octavals are short and broad in *erema* (fig. 38-d), longer, narrower, with rounded tips in *cocandaria* and even longer, with curved distal parts in *kasrunensis*. Moreover, both species are distinctly larger and different in appearance. In the absence of barcoding results (the attempt to barcode one of the male syntypes has not been successful), *G. erema* is treated here as a distinct species, based on morphological characters only. It may also be a subspecies (or a desert form) of the widespread *G. kasrunensis*. For evaluation of its real status freshly collected material of *G. erema* is necessary.

Taxonomic note. Wehrli based his description on two male specimens only, collected by E. P. Wiltshire in the Kerbela desert on 12. IV. and 1.V., respectively. He did not state which of the two should be the holotype, just mentioned: “holotype in his [Wiltshire’s] collection” (translated from German). Indeed, the specimen collected 1.V. 1937 is kept in the BMNH collection; Wehrli dissected it before (the description of the genitalia in Seitz 4, Suppl.: 566 is based on this preparation), but the genitalia slide No. 7251 could not be traced there (John Chainey, in litt. Dec. 2011). On the other hand, Wehrli labelled the second specimen which he kept in his own collection (now in coll. ZFMK) as “holotype” (an invalid subsequent type designation). This specimen also was figured in Seitz 4, Suppl., pl. 47f. It has been dissected now and agrees well with the description of the first specimen. Besides the two specimens mentioned above, Wiltshire collected another six specimens simultaneously. For some reason, Wehrli did not recognize them in the description. All are very similar in size and coloration and are also kept in the BMNH collection at present. *G. erema* is well defined by the two syntypes and there is no risk of confusing it with other taxa. So, to our opinion, a designation of a lectotype is not necessary.

Life history and habitat. All specimens studied have been collected in April and May, in the Kerbela desert in the centre of Iraq. In the original description, Wehrli (1939: 71) calls it a “desert species”, but no details about the characteristics of the habitat are known (except that it is a lowland habitat).

Distribution (Map 2). Only known from the type locality.

***Gnopharmia irakensis* Wehrli**

(Figs 14 & 39; Map 3)

Gnopharmia irakensis Wehrli, 1938: 433. Syntypes 1 ♂, 2 ♀, BMNH (photo of male examined). Type locality: Rowanduz [Rawanduz], Kurdistan, Iraq.

Gnopharmia irakensis: Wehrli, 1953: 566, pl. 47e; Ebert, 1965: 21, pl. 4, figs 2 & 3; Parsons et al., 1999: 406.

Type material examined. Syntype ♂, ‘Iraq, Kurdistan, Rowanduz [prov. Arbil], 15.VII.35, [leg.] E. P. Wiltshire, Wiltshire Coll. B.M. 1979-433’, ‘*Gnopharmia irakensis* Wehrli, ♂ Holo Type’ [red label, partly hand-written by Wehrli]; ‘7217 ♂’ [Wehrli genitalia preparation no.], in BMNH. Additional material studied: 137 ♂, 42 ♀, see appendix.

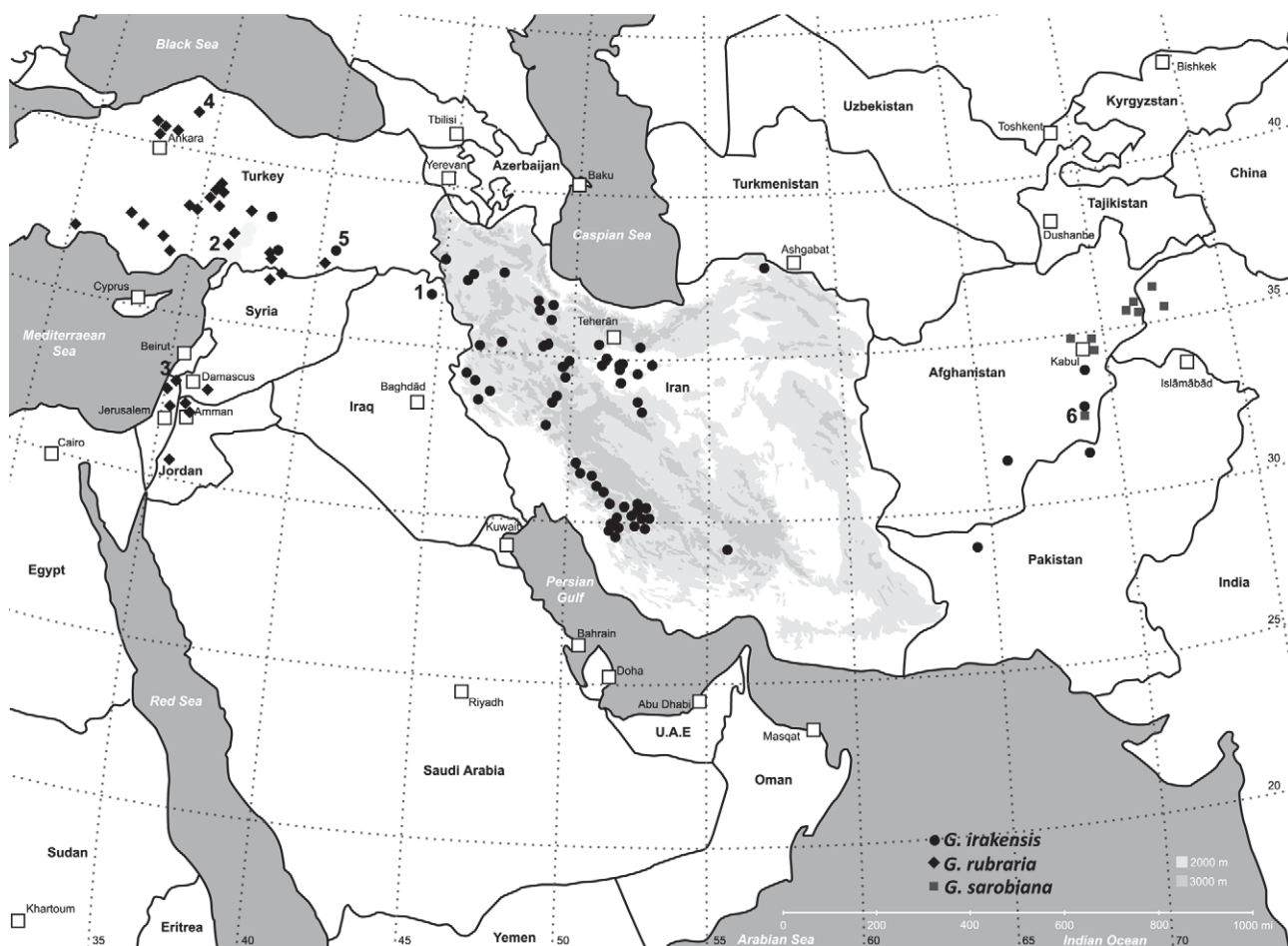
Description. Wings and body (Fig. 14). Frons moderately extended, rounded, distally without a separate central process. Genae with a weak antero-ventral process. Free apical flagellomeres in male antennae 18. Forelegs without tibial spine (fig. 2-b). Wingspan ♂ 21.5–30 mm. Ground colour of wings light yellowish brown; transverse lines indicated by a few rather indistinct dark brown spots, those on costa rather large, postmedial row consisting of more numerous but small spots which are often connected by a reddish-brown line. Broad, dark grey submarginal bands present, bordered distally by a light, dentate line; marginal area sometimes light as ground colour, but often also suffused dark grey (then the yellowish apical patch clearly visible). Discal dots blackish brown. Hindwings with colour and pattern elements similar, submarginal band broad, with almost straight internal border. Under side with basal two thirds almost white, slightly suffused with a few greyish-brown scales, discal dots blackish-brown, clearly marked. Submarginal bands very distinct, blackish-brown, a white apical patch present in forewings. Male genitalia and pre-genital abdomen (Fig. 39). Dorsal arm of valva narrow, sacculus wide, squarish, with two projections, the distal one strongly reduced and pointed (much shorter than the proximal one). Aedeagus very long and narrow, ventral fin absent; proximal subapical spines stout, 5–6 (may be also less or more) spines of variable size arranged in a cluster, arising latero-ventrally from aedeagus shaft. Distal subapical spines and cornuti absent. Octavals are long and narrow, with a small, rounded tip.

Diagnosis. Clearly distinguishable from the other *Gnopharmia* species by a number of external characters: frons in both sexes rather rounded than conically extended, male antennae with 18 unpectinated apical segments (12 or 10 in other *Gnopharmia* species), tibial spines absent in *irakensis* (present in all other species). In male genitalia, the absence of the ventral fin of the aedeagus is distinctive (present in all other *Gnopharmia*). Other characters of the male genitalia distinguishing *G. irakensis*: long and narrow dorsal arm of valva, strongly extended and almost quadrate sacculus with tooth-like projections of distinctly different size. Octavals are longer and narrower than in the other species (see fig. 39-d). Also the barcoding results (see fig. 54) have proved that *irakensis* is a species widely separated from all other taxa, with more than 5% genetic distance to each of them.

Taxonomic note. Wehrli (1938: 433) based his description on one male and two females from ‘Rowanduz, Irak’ which he called ‘types’ [„Typen“] (but without designating a holotype), and two additional females from ‘Rayat’ which he obviously did not include in the type series. Later Wehrli (1953: 566) also recorded *irakensis* from different Iranian regions and figured (l.c., pl. 47e) a male from ‘Alvand’ (West Iran). We received photos of the male syntype (upperside, under side, labels, see fig. 14)—which Wehrli had labelled subsequently as ‘holotype’—from BMNH. The genitalia slide (Wehrli no. 7217) examined and figured here (fig. 39) was found among the other genitalia preparations of the Wehrli collection in coll. ZFMK. It has been returned to BMNH just recently. To our opinion, there is no need to designate a lectotype for *G. irakensis*.

Life history and habitat. Flight period—according to the ample material studied here—from 2nd of May until 9th of September, the majority of specimens are dated from June and July. The species seems to be bivoltine. All specimens were attracted to light at night. Preimaginal stages are unknown. Host plant probably is a species of *Amygdalus* (Rosaceae), as observed for other species. *G. irakensis* occurs sympatrically with other *Gnopharmia* species.

Distribution (Map 3). Type locality of this species is Rawanduz in Eastern Iraq. In Iran this species is recorded from the Zagros Mts. (except its southern parts), western parts of the Alborz Mts. and from Kopet-Dagh in the north of Khorasan. Ebert (1965) published records of this species from East Afghanistan. Here we report *irakensis* from the East and South of Turkey and from North Pakistan (Kashmir) for the first time. Records are from altitudes between 400 and 3100 m a.s.l.



MAP 3. Distribution patterns of *G. irakensis*, *G. rubraria* and *G. sarobiana*

1. Rawanduz, Iraq (type locality of *G. irakensis*); 2. Marasch, E. Turkey (syntype locality of *G. rubraria*); 3. Jerusalem (lectotype locality of *G. rubraria*); 4. Köprüköy, Kizilirmak, N. Turkey; 5. Mardin; 6. Sarobi, E. Afghanistan (type locality of *G. sarobiana*).

Gnopharmia kasrunensis Wehrli

(Figs 15, 16, 17 & 41; Map 2)

Gnopharmia kasrunensis Wehrli, 1939: 70. Syntypes 11 ♂, 6 ♀, ZFMK (examined). Type localities: Kasrun, Kunar Takteh, SW. Iran. **Lectotype designated herein.**

Gnopharmia kasrunensis: Wehrli, 1953: 567, pl. 47f; Rajaei, 2010: 65–73; Parsons et al., 1999: 406.

Gnopharmia musandamensis Wiltshire & Legrain, 1998, **nom. nud.** (Fig. 17).

Type material examined. **Lectotype** ♂ (hereby designated in order to stabilize nomenclature): ‘Iran [Iran] mer. occ. [Fars] | Kasrun [Kazerun] | Kunar Takteh | 240 m, Ende III.38 [1938]’; Coll. ZFMK, Lectotype ♂, *Gnopharmia kasrunensis* Wehrli, 1939, des. Rajaei, Stüning & Trusch, 2011’ (see fig. 15).

Paralectotypes: 1 ♂, same data and locality as lectotype; 1 ♂, same data and locality as lectotype, Wehrli genitalia slide no. 7257; 1 ♂, same data and locality as lectotype, ‘*Gnopharmia maculifera* Stgr. *kasrunensis* Wehrli, ♂ Holotype’, ‘*Gnopharmia maculifera* Stgr. *kasrunensis* Wehrli, abgebildet Seitz IV. Suppl. fig.’; ‘gen. prep. 412/ 2008 H. R.’; 1 ♀, same data and locality as lectotype, Prep. SEM 40/ 2010; 3 ♂, ‘Iran [Iran] mer. occ. [Fars] | Kasrun | 900 m, Ende IV.38 [1938]’; 1 ♂, same data and locality (= *G. colchidaria sinesefida*); 1 ♂, same data and locality, gen. prep. 915/ 2010 H. R. (= *G. irakensis*); 1 ♀ same data and locality, ‘*Gnopharmia maculifera* Stgr. *kasrunensis* Wehrli, ♀ Allotype’, ‘*Gnopharmia maculifera* Stgr. *kasrunensis* Wehrli, abgebildet Seitz IV. Suppl. fig.’; ‘gen. prep. 885/ 2009 H. R.’; 2 ♀, same data and locality, Prep. SEM-19/2010 & genitalia slide 886/

2009; 1 ♀, same data and locality (= *G. irakensis*).—Collectors of E. Pfeiffer, Munich. All types in coll. ZFMK. 2 ♂, 2 ♀, ‘N-Oman, Musandam | env. Sayhakil, 600–950 m | 28.04. et 03.05.1992 | [leg.] A. Legrain, J. Plante | Fr. Aulombard’, ‘Paratype *Gnopharmia musandamensis* n.sp. Wiltshire, in lit.’, ‘gen. preps 418/2008, 913/2010 (♂), 417/2008 (♀), H. R.’, ‘*G. kasrunensis* Wehrli, 1939 | det. H. R., 2009’; Additional material studied: 221 ♂, 177 ♀, see appendix.

Description. Wings and body (Figs 15 & 16). Frons conically extended, with a separate central process set into a distal depression. Genae with a strong antero-ventral process. Free apical flagellomeres in male antennae 12. Forelegs with a long tibial spine. Wingspan ♂ 22–29 mm. Ground colour of wings light cream or greyish-white; transverse lines indicated by a few rather distinct, dark brown spots, slightly suffused with orange, those on costa rather larger and without orange hue. Postmedial row consisting of more numerous but smaller spots which are also rather orange than brown. Broad, dark grey submarginal bands present, bordered distally by the light, dentate submarginal line; marginal area sometimes light as ground colour, but often also suffused darker brown or grey (then the whitish apical patch very distinct). Discal dots blackish brown. Hindwings with colour and pattern elements similar, submarginal band broad. Under side with basal two thirds almost white, suffused with greyish-brown scales, more strongly so in the forewings. Discal dots blackish-brown, clearly marked, a white apical patch present in forewings. Submarginal bands very distinct, blackish-brown, proximal border strongly curved, its posterior end running into tornus or even into termen, often leaving the tornus in the hind wings white. Variation is very low in this species. Rarely the width of the submarginal bands on under side may be reduced, in a few specimens strongly so. Despite the large number of specimens we examined, we have not seen forms as they frequently occur in *G. colchidaria* or *G. cocandaria* (e.g. ground colour strongly suffused with dark grey or brown). Male genitalia and pre-genital abdomen (Fig. 41). Tooth-like projections of sacculus are of equal size. Aedeagus short (1.2–1.5 mm) and stout, with 2–6 proximal subapical spines of different length (up to 0.3 mm), longest spines exceeding the tip of the aedeagus shaft. Distal subapical spines completely absent, a large, multiple cornutus present on vesica. Ventral fin of aedeagus well developed (exceeding ½ diameter of the shaft). Octavals long (> 0.5 mm), with a wide, u-shaped gap between them, terminal parts strongly curved.

Diagnosis. Externally, *G. kasrunensis* strongly resembles the ‘*maculifera*’-form of *G. cocandaria*, however, the spotting is even a bit stronger in that form and the wing-shape more elongate. Also the shape of the aedeagus and the arrangement of spines are similar. However, the aedeagus is narrower in *cocandaria* and the proximal subapical spines do not exceed the tip of the shaft. In addition, *cocandaria* lacks a cornutus, but has some distal, tooth-like spines which are absent in *kasrunensis*. Moreover, both species do not occur sympatrically. *G. irakensis* and *G. colchidaria sinesefida* are species frequently collected together with *kasrunensis*. The former is very similar externally, just a little more brownish in ground colour and less distinctly spotted on upperside, the under side being extremely similar. But there are a number of characters clearly distinguishing both (see description of *irakensis* and diagnoses of previous species). *G. c. sinesefida* resembles *kasrunensis* in the shape of the frons and male antennae, but has a longer and narrower aedeagus with much shorter proximal spines, arranged in a straight row. In addition, there is one rather large distal spine present in *sinesefida*. Octavals are long in all three species, but strongly curved in the distal parts in *kasrunensis* only (fig. 41). Barcoding results (see fig. 54) indicate a clear distinctness of *kasrunensis* from other species of *Gnopharmia*.

Taxonomic note. Wehrli (1939: 70–71) based the description of *G. kasrunensis* on 11 males and 6 females, without designating a holotype. Nine males and all females could be found in his collection, which is part of the ZFMK Lepidoptera collection. As can be seen by his hand-written labels, he originally intended to describe *kasrunensis* as a subspecies of *G. maculifera* (now a synonym of *G. cocandaria*). He knew *maculifera* well, even the types, of which he had made photos by himself (l. c., p. 70 and 1953: 567). Wiltshire later (1967: 157) incorrectly stated that “In his revision of this genus in Seitz IV, Suppl., Wehrli omitted mention of this form (*maculifera*), described by Staudinger from Samarkand....” In fact, he mentioned it and compared it with *kasrunensis*. As part of the type series, we found one male and one female of *G. irakensis* and one male of *G. colchidaria sinesefida*, misidentified as *kasrunensis*. Therefore it was necessary to designate a lectotype for *kasrunensis*. Wehrli labelled a male and a female as ‘holotype’ and ‘allotype’, an invalid subsequent type designation. We chose another male of better quality (with complete set of legs and antennae) as lectotype (see fig. 15). Wiltshire and Legrain (1998) published two photos of a male and a female of *Gnopharmia ‘musandamensis’*, but without adding a description. According to article 13 of the ICZN (Fourth edition, 1999) this name is not available. Requirements for availability of new names published after 1930 include a description or definition to

differentiate the taxon. *G. musandamensis* therefore is a nomen nudum, but it is clearly conspecific with *G. kasrunensis* and represents an interesting new locality for this species. On the other hand, we could not find distinguishing characters that would allow us to treat the population from Oman as a distinct subspecies (see fig. 17). To decide this question more material is necessary.

Life history and habitat. Larval stages and biology are described by Rajaei (2010), morphology of eggs, larvae and a setal map chaetotaxial scheme of larva are figured. Larvae (L1–L4) were successfully reared on *Prunus (Amygdalus) scoparia* (Rosaceae). Probably, this species is not univoltine, but the number of generations (two or three) could not be stated exactly. The specimens studied here have a flight period from 9th February (Hormozgan, S. Iran, 830 m) until 12th September (Mian-Jangal, S. Iran), the majority was collected during May and June. All specimens were attracted to artificial light at night. In many localities in southern Iran *kasrunensis* occurs sympatrically with *G. c. sineseffida* and *G. irakensis*.

Distribution (Map 2). *G. kasrunensis* is distributed mainly in South and East Iran (central and eastern Zagros mountains), but some populations are also recorded from west of Iran. Single records from central and eastern Alborz mountains show that is also present but rare in the northern parts of Iran. The newly recorded localities from N. Oman ('*musandamensis*') are rather close (though separated by Strait of Hormus) to some of the main localities in E. Iran and therefore are not really surprising.

***Gnopharmia rubraria* Staudinger**

(Figs 27, 28, 29, 30, 43 & 44; Map 3)

Gnopharmia rubraria Staudinger, 1892: 184, pl. 2, fig. 12. Syntypes 4 ♂, 3 ♀, coll. Staudinger in MNHU (examined). Type localities: Marasch (SE Taurus, Turkey); Aintab (S. Turkey), Jerusalem (Israel). **Lectotype designated herein.**

Gnopharmia rubraria: Staudinger, 1901: 344; Prout, 1915: 384; Wehrli, 1953: 567, pl. 47d.

Gnopharmia rubraria rubraria: Parsons et al., 1999: 406.

Type material examined. Lectotype ♂ (hereby designated in order to stabilize nomenclature), 'Jerusalem | 91, Paulus, [1891]', 'Origin', 'Rubraria', 'GloblnG specimen ID: 0024', 'gen. prep. 402/2008 H. R.', 'Lectotype *G. rubraria* Staudinger, 1892 | design. here', '*G. rubraria* Staudinger, 1892 | det. H. R., 2009', in MNHU. Paralectotypes: 1 ♀ [Jerusalem, 91, Paulus, 1891]', 'Origin', 'gen. prep. 403/2008 H. R.', 'Paralectotype *G. rubraria* Staudinger, 1892 | design. here', '*G. rubraria* Staudinger, 1892 | det. H. R., 2009'; 1 ♂, 1 ♀, 'Palaestina', 'Cotype', in coll. Püngeler; 1 ♂, 'Aintab', '87 Man'; 'Origin.' 1 ♂, 'Marasch', '82 Manis', 1 ♀, 'Origin'. '18.5.', all in coll. Staudinger in MNHU. Additional material studied: 223 ♂; 20 ♀, see appendix.

Description. Wings and body (Figs 27–30). Frons moderately extended, with a shallow depression and a weak central protrusion distally. 12–13 apical segments of male antennae without pectination. Tibial spine acute, moderately long, with broad base. Wings broad, wingspan 26–30 mm, ground colour from pale cream to reddish-brown, suffused with dark grey scales or groups of scales, distinctly so on the hindwing upperside. Transverse lines of fore- and hindwings almost obsolete, only single small dark brown spots representing them are left, but those on costa at antemedial, medial and postmedial position are rather strong. The light, dentate submarginal line present, but a darker band and a distinct apical patch are mostly absent. Marginal line with black, interrupted streaks. Discal dots present, but small. Under side cream-coloured, strongly suffused with darker scales, dark marginal band absent or weak visible. Small discal dots present. Variation. Specimens intensively coloured reddish-brown mainly occur in SE. Turkey, N. Syria and Israel, but already Staudinger (1892: 185) mentions three specimens of the type-series having this colouration reduced to remnants in the basal part of the fore wings and an indistinct postmedial line. Often, especially in the western part of the distribution area, specimens almost or completely without reddish-brown colour occur. In this area, also specimens with a rather strong submarginal band on upper- and a broad marginal band on under side occur. The dark suffusion may be strong and also very dark, almost black specimens have been collected (fig. 30a). Male genitalia and pre-genital abdomen (Fig. 43–44). Sacculus with proximal tooth-like projections slightly longer than dorsal ones. Aedeagus long (1.3–1.9 mm) with a very large ventral fin. 1–2 (rarely 3) small distal subapical spines on ventral side near tip of aedeagus present, proximal subapical spines at large distance to them, variable in size: there may be two or three long or moderately long spines in the eastern and southern populations (East Turkey, Syria, Palestina, Israel; see map 3), one very short in the populations from western Turkey, often it is completely absent in specimens from Central and Northern Turkey. Specimens from

Marasch (Maraš), geographically in the middle between both, exhibit long and short and also intermediate forms of spines. Cornutus on vesica absent. Octavals bulged at basal part, constricted subapically; length 0.4–0.5 mm.

Diagnosis. The reddish-brown ground colour of the wings may be a useful character to distinguish this species from other *Gnopharmia*, but specimens with similar coloration are also known from other species, in addition, the variability of ground colour is high in *rubraria*. Consideration of the geographical origin is important (see map 3). In the Levant, obviously (as far as we know) only *G. rubraria* occurs. In Eastern Turkey, however, also *G. irakensis* and *G. colchidaria* are present, but rare. In males, the length of the unpectinated distal part of the antennae may help to distinguish *rubraria* from *irakensis* (12–13 free segments in *rubraria*, 18 in *irakensis*). Also the tibial spines are different: rather long and acute in *rubraria*, short and triangular in *colchidaria*, absent in *irakensis*. Of course, the male genitalia are also distinct in the three species. Especially distinctive is the very large ventral fin in *rubraria* (small in *colchidaria*, absent in *irakensis*). Barcoding results (see fig. 54) confirmed that *rubraria* is a distinct species.

Taxonomic notes. Staudinger (1892: 184) described *G. rubraria* based on seven specimens, two males and two females from Jerusalem, one male from “Aintab” (Gaziantep, SE. Turkey), and one male and one female from “Marasch” (Maraš, Kahramanmaraš; S. Turkey). He stated already a certain variability in the type-series, concerning reduction of the reddish-brown ground colour. The same did Wehrli (1953), stating an extremely high variability for his material from S. Turkey. We even found specimens without any trace of reddish colour and some being almost black. Wehrli (l.c.) also expanded the area of distribution for *rubraria*, adding Armenia (Negram, Darasham), Iran (Elburs, Demavend) and “Transcaspien” (Turkmenia: Ashkhabad, Merw). All these specimens have been examined. They are very similar to *rubraria* by the reddish-brown ground colour, but belong to *G. colchidaria colchidaria*, *G. c. sinesefida* and *G. c. objectaria*, respectively. Only the two specimens from “Merw” (NE. Turkmenia) are true *G. rubraria*, but very probably they are mislabelled. To our knowledge, *G. rubraria* does not occur in the whole Transcaspien region.

Life history and habitat. Early stages and biology unknown, but larval foodplant probably –as in other taxa– is a species of bitter almond. As the geographic distribution of the three *Amygdalus* species (*A. orientalis* Duhamel; *A. trichamygdalus* (Hand.-Marz.) Woronow and *A. arabica*) (Browicz & Zieliński, 1984) is matching with that of *G. rubraria*, we suppose that one or more of these species should be the larval hostplant. Wehrli (1953: 568) concluded from his large, dated material from Marasch (Maraš; S. Turkey) that *G. rubraria* occurs in three generations, during April–May, June–August and in November, with a peak-activity in May and June (June–July according to our material). Obviously, the generations are not clearly separated. Elevation of collecting sites according to Wehrli (l. c.) between 600 m and 1500 m (between 150 m and 1100 m according to our additional material). Earliest record April 6th (Urfa, Turkey, 400 m a.s.l., the latest date September 15th (Jordan, Irbid, 900 m a.s.l.) and even November at Marasch (Wehrli, l. c.).

Distribution (Map 3). Israel, Palestine, Syria, Jordan, Lebanon, East and Central Turkey.

Gnopharmia sarobiana Ebert

(Figs 31, 32, 33, 34 & 40; Map 3)

Gnopharmia sarobiana Ebert, 1965: 19, pl. 1, fig. 16; pl. 4, fig. 1. Holotype ♂, paratypes 10 ♂, 7 ♀, SMNK (examined). Type locality: Sarobi, E. Afghanistan.

Gnopharmia objectaria luxuriosa Wiltshire, 1967: 156, pl. 2, figs 18, 19; pl. 13, figs 51–53. **syn. nov.** (Figs 33 & 34). Holotype ♂, paratypes ♂/♀ (see material studied), SMNK (examined). Type locality: Nuristan: Bashgul valley (NE. Afghanistan).

Type material examined. *Gnopharmia sarobiana*: Holotype ♂, [Afghanistan] ‘Sarobi, 1150 m | 16.iii.1963, O. Hammer leg., ‘Genital-Untersuchung Nr. G. 91, ♂’, ‘*G. sarobiana* Ebert, 1965 | Holotype’, ‘*G. sarobiana* Ebert, 1965 | det. H. R., 2009’, in SMNK. Paratype ♀ (examined), ‘[Afghanistan] Sarobi, 1150 m | 13.iii.1963, O. Hammer leg., ‘Genital-Untersuchung Nr. G. 83, ♀’, ‘*G. sarobiana* Ebert, 1965 | Paratype’, ‘*G. sarobiana* Ebert, 1965 | det. H. R., 2009’; further paratypes (examined): same locality and collector, 1 ♂, 13.iii.1963, GU Nr. G 9; 5 ♀, 7.–19.iv.1962, GU Nr. G 101; 1 ♀, 22.iii.1963, gen. prep. 905/2009 H. R., all in SMNK. *Gnopharmia objectaria luxuriosa*: Holotype ♂ (examined), ‘[leg.] J. Klapperich | Bashgultal 1100 m | Nuristan, 6.5.1953 | Afghanistan’, ‘*Gnopharmia objectaria luxuriosa* Wiltshire, Holotype’, ‘gen. prep. 603/2009 H. R.’, ‘*G. sarobiana* Ebert, 1965 | det. H. R., 2009’, in SMNK. Paratypes (examined; same locality as holotype, but with different data and altitudes):

4 ♀, 6.4.1953, 3 ♀, 2 ♂, 6.5.1953, gen. preps 597, 902 and 903/2009 H. R. and 443 Wiltshire [the latter not traced], 1 ♀, 1 ♂, 14.5.1953, gen. prep. 605/2009 H. R.; 1 ♀, 9.4.1953, 1 ♀, 22.4.1953; 3 ♂, 1 ♀, id. 1150 m, 19.5.1953 'gen. preps 601, 606 and 608/2009 H. R.'; 2 ♂, id. 1200 m, 3.5.1953, gen. preps 598 and 602/2009 H. R., 1 ♂, id. 11.5.1953, gen. prep. 604, 1 ♂ id., 30.4.1953, gen. prep. 607, 1 ♂, id. 1300 m, gen. prep. 600/2009 H. R.; 1 ♂, 1 ♀, '[leg.] J. Klapperich | Kutiau 1450 m | Nuristan, 2.5.1953 | Afghanistan', 'genitalia preparation E. P. Wiltshire no. 939'; all labelled '*Gnopharmia objectaria luxuriosa* Wiltshire, Paratype', and '*G. sarobiana* Ebert, 1965 | det. H. R., 2009'. Additional material studied: 22 ♂, 3 ♀, see appendix.

Description. Wings and body (Figs 31–34). Frons strongly extended, but distally without a separate central process. Free apical flagellomeres in male antennae 12 (13 by Ebert, 1965). Tibial spine long and acute. Wingspan 25–28 mm, ground colour of wings yellowish ochreous, suffused with grey and dark brown. Forewing with antemedial, medial and postmedial lines represented by a few dark grey spots, most conspicuous those on costa. Postmedial incurved in the middle, sometimes the spots connected by a narrow, reddish-brown line. Area between postmedial and the light, zigzag-shaped submarginal line dark grey, forming a centrally constricted band. Marginal area rather homogeneously reddish-brown, striated dark grey, a light ochreous apical patch present, but sometimes indistinct. Hindwing with medial and postmedial lines similar, rather straight. Submarginal area like in fore wings. Under side with basal two thirds greyish-white or grey, strongly suffused with darker scales; a darker grey submarginal band without distinct borders present, a pale creamy forewing apical spot often clearly visible. Discal dots present, large and clear on under side, but also visible on upperside. Variation. Rather low in Sarobi specimens. Remnants of the ochreous yellow ground colour are more ample in the *luxuriosa* form. The latter also have the dark marginal bands on under side more distinct. Male genitalia and pre-genital abdomen (Fig. 40). Sacculus not extended, tooth-like projections small, the proximal a bit larger than the distal ones. Aedeagus long (> 1.5 mm), with a long coecum penis and a rather small ventral fin. Proximal subapical spines inserting dorso-laterally, consisting of at least one large spine (length up to 0.3 mm) and one or two small ones, sometimes of two or even three large spines, all of them slightly curved. Distal subapical spines always a single, short tooth, inserting ventrally near the apex, with a large gap between both groups. A tiny multiple cornutus present. Octavals of sternite A8 straight and a narrow, almost v-shaped opening between them.

Diagnosis. *G. sarobiana* is distinctive in its rather large size, broad and rounded wings and dark brown and grey coloration. Rarely, specimens of *G. colchidaria objectaria* and *G. cocandaria* may be similar. *G. cocandaria afghanistana* Wiltshire approaches the range of distribution of *sarobiana* in the North of Afghanistan (see map 3). However, the only known specimen of *afghanistana* is smaller and lighter and exhibits the '*maculifera*'-pattern of *cocandaria* (see fig. 12). Male genitalia of both are rather similar, but *cocandaria* has a shorter and stouter aedeagus, especially a shorter coecum penis, more numerous distal subapical spines which are closer to the proximal ones and cornuti on vesica are absent in *cocandaria*. The only species which has been found flying together with *sarobiana* is *G. irakensis* (see Ebert, 1965). It can be distinguished externally by lighter ground colour, distinct dark marginal bands on under side of both wings, rounded, not conically extended frons, 18 unpectinated, distal segments in male antennae (12 in *sarobiana*) and by means of genitalia. *G. sarobiana* is known only from East and Northeast Afghanistan and N. Pakistan (see map 3).

Taxonomic note. Ebert (1965: 19) described *G. sarobiana* as bona species, explicitly distinguishing it from other *Gnopharmia* specimens collected at Arghandab river, 30 km N of Kandahar (about 300 km SW of Sarobi). The latter he named as "*Gnopharmia objectaria* Staudinger? ssp.". He clearly described the external differences and also the variations of male genitalia which occur in this *objectaria* ssp. (and which agree with those we also found in other *objectaria* specimens). Indeed, *G. sarobiana* looks quite different externally by size, wing-shape and coloration. By the long proximal subapical spines in male aedeagus it even seems to be more closely related to *G. cocandaria* than to *G. colchidaria objectaria*. On the other hand, comparatively long proximal spines also rarely occur in *objectaria* specimens and length and shape of aedeagus (long coecum penis, ventral fin almost at centre), shape of octavals and other characters (frons, tibial spines) also seem to place *sarobiana* closer to *objectaria*. Moreover, Wiltshire (1967: 156) described his "*luxuriosa*" as a subspecies of *G. objectaria*. We synonymised it with *sarobiana*, as it surely does not represent a real geographic race. Even the type material contains specimens rather more similar to true *sarobiana*. Male genitalia are also like those of *sarobiana*. So *luxuriosa* should be considered as infrasubspecific form or variation. We were inclined to treat *G. sarobiana* as the fourth subspecies of *G. colchidaria* rather than as a distinct species. Unfortunately, molecular data for *sarobiana* which could prove this are not yet at hand and so we have to leave this question unsolved at present.

Life history and habitat. Flight period from March to July. The earliest collecting-date of the material studied here is 13th of March (Sarobi), the majority of specimens were collected in May and July, and the latest record is of 20th July (Paghman, 2500 m). Early stages and host plants of larvae are unknown.

Distribution (Map 3). Most specimens are collected from Eastern and North-Eastern Afghanistan. Here we report the species from Pakistan for the first time.

Checklist of species with taxonomic changes introduced in this paper

Gnopharmia cocandaria cocandaria (Erschoff, 1874) stat. rev.

maculifera Staudinger, 1892 **syn. nov.**

rubraria subrubraria Staudinger, 1892 **syn. nov.**

G. cocandaria afghanistana Wiltshire, 1967 **comb. nov.**

G. colchidaria colchidaria (Lederer, 1870)

colchidaria melanotaenia Wehrli, 1938 **syn. nov.**

G. colchidaria sinesefida Wehrli, 1941 **stat. nov.**

G. colchidaria objectaria Staudinger, 1892 **stat. rev.**

degeneraria Staudinger, 1892 **syn. nov.**

inermis Wiltshire, 1967 **syn. nov.**

inermis vartianae Wiltshire, 1970 **syn. nov.**

eberti Wiltshire, 1967 **syn. nov.**

maculifera kasyi Wiltshire, 1970 **syn. nov.**

G. erema Wehrli, 1939

G. irakensis Wehrli, 1938

G. kasrunensis Wehrli, 1939

(*musandamensis*, Wiltshire & Legrain, 1998, **nom. nud.**)

G. rubraria Staudinger, 1892

G. sarobiana Ebert, 1965

objectaria luxuriosa Wiltshire, 1967 **syn. nov.**

Key to the Species

This key is based on male genitalia and on characters of the pre-genital abdomen ('octavals') only. Determination by external features like pattern and coloration is hardly possible because of the high intraspecific variability of all taxa. Concerning the female genitalia, we have not been able to discover characters that clearly distinguish the species; moreover they are variable in a number of characters.

G. erema is not included in this key since this taxon is very rare and known from one locality in Iraq only.

1. a. Ventral fin of the aedeagus absent (fig. 39-c). Octavals of sternite A8 long and narrow. Distributed nearly in all parts of the Middle East *G. irakensis* 2
1. b. Ventral fin of the aedeagus present 2
2. a. Aedeagus with long proximal subapical spines (> 0.2 mm) 3
2. b. Aedeagus with short proximal subapical spines (≤ 0.15 mm) or without those 5
3. a. Octavals of sternite A8 short (< 0.4 mm), blunt at the end (fig. 42-d). 1–3 distal subapical spines of aedeagus present, but very small. Cornuti on vesica absent. Distributed in East Uzbekistan, Tajikistan, Kyrgyzstan and North Afghanistan *G. cocandaria*
3. b. Sternite A8 with long octavals (> 0.5 mm) 4
4. a. Octavals curved at the end. Aedeagus short (1.2–1.5 mm), with 2–6 relatively large proximal subapical spines (up to 0.3 mm), but no distal subapical spine. A large cornutus present. Size of the tooth-like projections of the sacculus equal (fig. 41a). Mainly distributed in southern parts of Iran *G. kasrunensis*
4. b. Octavals of sternite A8 are straight and narrow at the end. Aedeagus long (> 1.5 mm), with 2 proximal subapical spines (larger one up to 0.3 mm) and 2–3 distal subapical spines. Upper and lower tooth-like projections of the sacculus are not of the same size (fig. 40a–c). Known from East and Northeast Afghanistan. *G. sarobiana*
5. a. Ventral fin larger than width of aedeagus 6
5. b. Ventral fin smaller than width of aedeagus 7

6. a. 1–2 very short distal and 2 (rarely up to 3) mostly long proximal subapical spines present on the aedeagus (fig. 44b–c). Octavals of sternite A8 constricted subapically (fig. 44d). Distribution: SE. Turkey, Lebanon, Syria, Israel *G. rubraria rubraria*
6. b. Subapical spines on the aedeagus absent, rarely one distal and/ or a very short proximal spine left. Base of the octavals of sternite A8 swollen and subterminally constricted (fig. 43–b). Distribution: Western and Central Turkey. *Grubraria rubraria*
7. a. Sternite A8 with relatively short octavals (< 0.45 mm), with a widely rounded opening between them (fig. 35–d). There is only one small (rarely 1 longer or 1 short and 1–2 longer) proximal subapical spine on the aedeagus, and 2–3 distal subapical spines. A small, weakly sclerotized cornutus on the vesica present. Distributed in Northeast Iran, South Turkmenistan, West and East Afghanistan and W. Pakistan *G. colchidaria objectaria*
7. b. Sternite A8 with relatively large octavals (> 0.5 mm), with a comparatively narrower opening between the octavals. Aedeagus with 1–3 distal subapical spines and 2–3 (rarely up to 5) cone- shaped proximal subapical spines. Small to moderately large cornuti present on the vesica. 8
8. a. Array of proximal subapical spines arranged in a curved line (fig. 37-c). Cornutus very small. Distributed in Armenia, Azerbaijan, NW Iran and East Turkey *G. colchidaria colchidaria*
8. b. Array of proximal subapical spines arranged in a straight row (Fig. 36-c). Cornutus large. Distributed in the western part of the Alborz Mts. and many regions of the Zagros Mts., West and South Iran *G. colchidaria sinesefida*

Acknowledgements

We thank Wolfram Mey (Museum für Naturkunde der Humboldt-Universität, Berlin, Germany), A.V. Sviridov (Zoological Museum of Moscow State University, Moscow, Russia) and Sabine Gaal-Haszler (Naturhistorisches Museum Wien, Austria) for loan of type material. W. Mey also helped the senior author when he stayed at the MNHU collection and later sent an additional type to Bonn on request. We also thank Axel Hausmann (Zoologische Staatssammlung München, Munich, Germany) and Vladimir Mironov (Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia) for loan of *Gnopharmia* specimens from various localities. Axel Hausmann also generously helped the senior author when he stayed in Munich and V. Mironov translated a number of labels written in Russian. Our thanks are due to Helen Alipanah, Ebrahim Ebrahimi and the colleagues of the ‘Hayk Mirzayans Insect Museum’ in the Iranian Research Institute of Plant Protection (Tehran) for the loan of Iranian material under their care and to Jörg-Uwe Meineke (Kippenheim, Germany), Jörg Gelbrecht (Königs Wusterhausen, Germany), Dirk Stadie (Eisleben, Germany), Ralf Fiebig (Roßleben, Germany) and Manfred Sommerer (Munich, Germany) for the loan of valuable specimens from their private collections. Further thanks go to John Chainey and Martin Honey (The Natural History Museum London, UK), the first for sending us photos of the types of *G. irakensis* and *G. erema*, the latter for his kindness and help during the stay of H. R. in London. Stanislav Korb (Nizhny Novgorod, Russia) served as a courier, bringing a type from Moscow to Berlin, and Vadim V. Zolotuhin cared for the transport back. He also helped to discover the type of *G. cocandaria* at ZMMU and translated its Russian description. Paul Hebert (Biodiversity Institute of Ontario, Guelph, Canada) and Axel Hausmann provided the main part of genetic data from the BOLD database; the DNA studies were supported by Genome Canada, the Ontario Ministry of Research and Innovation and Natural Science and Engineering Research Council of Canada (NSERC) in the framework of the International Barcode of Life (iBOL) program. We also thank our colleagues of ZMB (Center of Molecular Biodiversity Research) at ZFMK for financial and scientific supports of the molecular part of this project. Stefan Scharf prepared the basal version of the distribution maps and Michael Falkenberg (both Staatliches Museum für Naturkunde, Karlsruhe, Germany) helped during different steps of this project. Karin Ulmen gave special help to H. R. on SEM operations at the ZFMK. Lennart and Gisela Stüning (Meckenheim, Germany) helped translating some original descriptions from Latin and French. We also thank Günter Ebert and Axel Steiner (Staatliches Museum für Naturkunde, Karlsruhe, Germany) and Bernd Müller (Berlin) for their valuable comments on earlier versions of this manuscript and the latter for his help during a visit of H. R. to Berlin, sharing his profound knowledge of the Staudinger collection with him. The senior author is deeply obliged to J. W. Wägele (ZFMK) for his continuous support of the project and to the DAAD (Deutscher Akademischer Austausch Dienst) for financial support. This paper is drawn from part of a PhD thesis by H. R.

References

- Antonova, E.M. (1981) Typical specimens of Lepidoptera kept in the collections of the Zoological Museum of the Moscow State University. *Issledovanija po faune Sovetskogo Sojuza* [Investigations on a fauna of the Soviet Union]. *Proceedings of the Zoological Museum of MSU*, 19, 208–227 (in Russian).
- Browicz, K. & Zieniński, J. (1984) Chorology of Trees and Shrubs in South-West Asia and Adjacent Regions. Vol. 4, Warszawa-Poznań, Polish scientific publishers.
- Christoph, H. (1885) Lepidoptera aus dem Achal-Tekke-Gebiete. Zweiter Theil. *in*: Romanoff, Mémoires sur les Lépidoptères, 2, 119–171.
- Ebert, G. (1965) Afghanische Geometriden (Lep.) I. *Stuttgarter Beiträge zur Naturkunde*, 142, 1–32.
- Erschoff, N.G. (1874) Cheshuekrylye (Lepidoptera) I–VI, 1–128, pl. 1–6. *in*: Fedchenko, A. P. Puteshestvie v Turkestan [Journey to Turkestan], vol. 2, Zoogeograficheskie issledovanija part 5.-St. Petersburg, Moskwa (in Russian).
- Evenhuis, N.L. & Samuelson, A. (2007) The Insect and Spider Collections of the World website of the Bishop Museum, Honolulu, Hawaii. <http://hbs.bishopmuseum.org/codens/codens-r-us.html>. (website visited January 12, 2011).
- Hausmann, A., Hebert, P.D.N., Mitchell, A., Rougerie, R., Sommerer, M., Edwards, T. & Young, C. (2009) Revision of the Australian *Oenochroma vinaria* Guenée, 1858 species-complex (Lepidoptera: Geometridae, Oenochrominae): DNA barcoding reveals cryptic diversity and assesses status of type specimen without dissection. *Zootaxa*, 2239, 1–21.
- Lederer, J. (1870) Contributions a La Faune des Lépidoptères de la Transcaucasie. *Annales de la Société Entomologique de Belgique*, 13, 39–48.
- Oshel, Ph. (1997) HMDS and Specimen Drying for SEM. *Microscopy today*, 5 (4), 16.
- Parsons, M.S., Scoble, M.J., Honey, H.R., Pitkin, L.M. & Pitkin, R.B. (1999) The catalogue. *in*: Scoble, M.J., ed. Geometrid Moths of the world: a catalogue (Lepidoptera, Geometridae). Collingwood: CSIRO Publishing, 1046 pp.
- Prout, L.B. (1912–1916) Die spannerartigen Nachtfalter. *in*: Seitz, A. [ed.]. Die Gross-Schmetterlinge der Erde 4: i-v, 1–479, pls. 1–25. Stuttgart, Alfred Kernen Verlag.
- Rajaei, H. (2010) Life-history of *Gnopharmia kasrunensis* Wehrli, 1939 and *G. colchidaria* Lederer, 1870 (Geometridae, Ennominae) and their distribution in Iran, with first host-plant records for the genus. *Bonn zoological Bulletin*, 57 (1), 65–73.
- Ratnasingham, S. & Hebert, P.D.N. (2007) BOLD: The Barcode of Life Data System (<http://www.barcodinglife.org>). *Molecular ecology Notes*, 7 (3), 355–364.
- Ride, W.D.L., Cogger, H.G., Dupuis, C., Kraus O., Minelli, A., Thompson, F.C. & Tubbs, P.K. (1999) International Code of Zoological Nomenclature, Fourth ed. The International Trust for Zoological Nomenclature, ISBN 0853010064. 1–126.
- Robinson, G.S. (1976) The preparation of slides of Lepidoptera genitalia with special reference to the Microlepidoptera. *Entomologist's Gazette*, 27, 127–132.
- Scoble, M.J. & Krüger, M. (2002) A Review of the genera of Macariini with a revised classification of the tribe (Geometridae: Ennominae). *Zoological Journal of the Linnean Society*, 134, 257–315.
- Scoble, M.J. & Hausmann, A. [updated 2007]. Online list of valid and available names of the Geometridae of the World, http://www.lepbarcoding.org/geometridae/species_checklists.php Page visited 25 December 2011.
- Staudinger, O. (1892) Neue Arten u Varietäten von paläarktischen Geometriden. *Deutsche entomologische Zeitschrift Iris*, 5, 141–260.
- Staudinger, O. & Rebel, H. (1901) Catalog der Lepidopteren des Palaearctischen Faunengebietes (Ed. 3). R. Friedländer & Sohn, Berlin, 368 pp.
- Tamura, K., Peterson, D., Peterson, N., Stecher, G., Nei, M. & Kumar, S. (2011) MEGA5: Molecular Evolutionary Genetics Analysis using Maximum Likelihood, Evolutionary Distance, and Maximum Parsimony Methods. *Molecular Biology and Evolution*, msr121v1-msr121.
- Viidalepp, J. R. (1988) Fauna pjadenits gor Sredhej Azii [The fauna of Geometrid Moths of the mountains of Central Asia]. Moscow, Publ. Nauka, 240 pp. [in Russian].
- Wehrli, E. (1938) Nachtrag zu meiner Arbeit in Nr. 31 d. J. Seite 354 [Neue Gattungen, Untergattungen, Arten und Rassen von Geometriden (Lep.)]. *Entomologische Rundschau*, 55 (37), 433–434.
- Wehrli, E. (1939) Einige neue Arten und Rassen aus dem südwestlichen Iran und aus dem Irak, sowie ein neues Subgenus aus dem letzteren. (Lepid. Geometr.). *Mitteilungen der Münchner Entomologischen Gesellschaft*, 29 (1), 70–71.
- Wehrli, E. (1941) Einige neue Geometriden. *in*: Brandt, W. Beitrag zur Lepidopteren-Fauna von Iran (4). *Mitteilungen der Münchner Entomologischen Gesellschaft*, 31, 864–886.
- Wehrli, E. (1939–1954) 6. Subfamilie: Geometrinae. *in*: Seitz, A. (ed.). Die Gross-Schmetterlinge der Erde 4, Die Spanner des palaearktischen Faunengebietes (Suppl.), 254–722, pls. 19–53. Stuttgart, Alfred Kernen Verlag.
- Wehrli, E. (1951) Une nouvelle classification du genre *Gnophos* Tr. *Lambillionea*, 51, 6–11, 22–30, 34–37.
- Wiltshire, E.P. (1967) Middle East Lepidoptera XX, A third contribution to the Fauna of Afghanistan. *Beiträge zur naturkundlichen Forschung in Südwestdeutschland*, 26 (3), 137–169.
- Wiltshire, E.P. (1970) Österreichische entomologische Expeditionen nach Persien und Afghanistan. *Annalen des Naturhistorischen Museums in Wien*, 74, 387–398.
- Wiltshire, E.P. & Legrain, A. (1998) Provisional Checklist of the Macro-heterocera [Lepidoptera] of the UAE. *TRIBULUS (Bulletin of the Emirates Natural History Group)*, 8 (2), 5–8.

Appendix

Additional material examined:

Gnopharmia colchidaria colchidaria (Lederer, 1870)

1 ♂, [Iran] E. Azarbayjan, Jolfa, Nourduz, Aras river, 520 m alt. N38°53'59", E46°17'53", 14.VII.2005, [leg.] Zahiri, Khiaban, N. gen. prep. 129/2005 H. R.; 1 ♂, 1 ♀, [Iran] W Azarbayjan, 15 Km NE Maku, 6.6.1975, [leg.] Abai, gen. preps 114, 379 & 380/2005 H. R.; 2 ♂, 1 ♀, [Iran] Azarbayjan, Khoy, 30 km Ghotur, 1480 m, 19.7.1976, [leg.] Pazuki, Broumand, gen. preps 115, 375 & 376/2005 H. R.; all in HMIM. 1 ♂, USSR, Armenia, Goris, 1500 m, 15.06.1965, leg. Cvetajev, Coll. K. Krusek, gen. prep. 609/2009 H. R.; 1 ♂, Asia minor, Elazig, 24.5.[19]66, leg. Dr. Sielmann, gen. prep. 929/2010 H. R.; 2 ♂, Ordubad, 1.VI.1934, leg. M. Rjabov, gen. prep. 927/2010 H. R.; 1 ♂, Transkauk. fl. Arax, st. Negram II, 20.V.[1]934, M. Rjabov; Dr. Wehrli, Basel, 34 89; 4 ♂, Transkauk. fl. Arax, st. Darasham II, 20.V.[1]934, M. Rjabov; Dr. Wehrli, Basel, 34 89, prep. 1667/2011 H. Rajaei; all in ZFMK. 1 ♂, 3 ♀ Armenia, Khosrov reserve, 1400 m üNN, 9.-13.09.1997, leg. M. Kalaschan, gen. prep. 867/2009 H. R.; 1 ♂, Armenia, Khosrov State Reserve, 200 m, 20.VI.-10.VII.1996, leg. A. Dantchenko, EMEM Sept. 1996, gen. prep. 868/2009 H. R.; 3 ♂, Türkei, prov. Hakkari, Altin Doglari O-Seite Süvar ihalil Gesidi 2400 m, 40 km wsw Hakkari, 27.6.1984 L.F, leg. Weigert, gen. preps 832, 833 & 834/2009 H. R.; all in ZSM. 8 ♂, [Armenia], Megri (1x) 7.V.[19]37; (7x) 11.6.[19]37, leg. Rjabov; 2 ♂, 1 ♀, [Azerbaijan] Dorasham, 1 ♂ 23.VI.[1]936, 1 ♂ 15.VII.[1]934, 1 ♂ 25.VIII.[19]32, 1 ♀ 21.V.[1]934, 1 ♀ 22.V.[19]36, leg. Rjabov; 1 ♂, 1 ♀, [Armenia] Geogdag, 11.-12.VI.[19]37, leg. Rjabov; 1 ♂, [Azerbaijan] Kərməçatax (=Germachata =Kermechatakh =Kyarmachatakh), 22.VI.[19]37, leg. Rjabov; 5 ♂, 4 ♀, [Armenia] Arpachay River near Pashalu Bridge, 3.-9.VIII.[19]37, leg. Rjabov; all in ZISP.

Total number of specimens studied: 38 ♂, 13 ♀ (Except type material).

G. cocandaria (Erschoff, 1874)

1 ♂, Asia center, Uzbekistan, Turkestan-Kette, Umg. Kjugli, 1500 m, 10.Juni.1989, leg. Dr. M. Weidlich, gen. prep. 611/2009 H. R.; 1 ♂, 1 ♀, USSR, Tadjikistan, FL.Kondara, 20.7.1959, leg. Cvetajev, gen. preps 612 & 613/2009 H. R.; 1 ♂, (same locality) 15.7.1960, coll. Cvetajev, gen. prep. 916/2010 H. R.; 1 ♂, Uzbekistan (USSR), Hissar, Kondara, 15.6. [19]86, leg. K. & L. Krusek, gen. prep. 926/2010 H. R.; 1 ♂, Kirgisias, 15 km N Tash-Kömür, N 41° 26' 53", E 72° 15' 59", 650 m LF 15.07.04, leg. O. Schmitz, gen. prep. 918/2010 H. R.; 1 ♂, [Tajikistan] Garm, Gbg. Peter d. Gr. Juni, gen. prep. 7223; all in ZFMK; 1 ♂, Kyrgyzstan (at border of Uzbekistan) northeast of Madaniyat, 900 m, N 41° 05' E 72° 21', 25.vii.1998, leg. T. Drechsel & A. Kallies, gen. prep. 745/2009 H. R.; 4 ♂, 3 ♀, Asia center, Kirgisias, N 41° 45.55' E 74° 09', Sarikamish Mts., 1500 m, river Kajokjomeran, 16.-18.VII.1994 L.F.leg. Kallies & Petersen, gen. preps 746 & 747, ♀ 890 & 891/2009, SEM preparation no. 27/2010 H. R.; all in PCJG. 3 ♂, Kirgisien Moldatoo-Gebirge 120 km W Naryn, Tschon-Koduk, 1800-2000 m, 27.-28.VI.1995, leg. V. Lukhtanov, gen. preps 850, 851 & 852/2009 H. R.; 1 ♂, Uzbekistan, Nuratau ca. 1000 m NN, Kisil-Bel bei Sarmitan Tal des Aksaj-Flusses (felsiges Steppental), 40°23' n.Br. 66°40' ö.L., 01.VII.1998 LF 125 W HQL leg. Karisch, gen. prep. 854/2009 H. R.; 1 ♂, Uzbekistan, Parkent, Nevitch. 1400 m, 5.08.1993, leg. V. Murzin, gen. prep. 855/2009 H. R.; 1 ♂, Uzbekistan, 1300 m, Nuratau-Gebirge Sarmitan, 16.V.1994, leg. V. Lukhtanov, EMEM, 23.IX.1997, gen. prep. 856/2009 H. R.; 1 ♂, Kazakhstan, prov. Almaty, Uzunbulak, Mt. Kuluktau, 1800 m, 79°02' E, 43°08' N, 29.V.1994 leg. Gy. Fabian & I. Retezar Coll. M. Sommerer (München), gen. prep. 857/2009 H. R.; 5 ♂, Tadjikistan, Gissar gebirge, Kandara, 1100 m, 07.-10.VII.1998, leg. Local coll., gen. preps 860, 861, 862 & 863/2009, SEM preparation no. 15/2010 H. R.; 5 ♂, Tadzshikistan, 2000 m, Turkestan Mountains Shakristan Pass, Khushikat, 6./7.VI.1994, leg. V. & A Lukhtanov, gen. preps 864, 974, 975, 976 & 977/2010 H. R.; 2 ♂, Tadjikistan, Fl. Obichingou, bei Tawildara. 01.VII.1970, 1850 m leg. Stschetkin, gen. preps 858 & 859/2009 H. R.; 2 ♂, Tadzshikistan, 20 km NW Tursunsade Gissar Mountains, 1000-1200 m, 30.VI.-3.VII.1994, leg. V. & A. Lukhtanov, gen. preps 978 & 979/2010 H. R.; all in ZSM. 1 ♀, Samarkand, [leg.] O. Herz, 1892, Sh., Coll. Great Knjaz Nikolaj Mikhailovich, *maculifera* Stgr. No. 8262; in ZISP.

Total number of specimens studied: 32 ♂, 5 ♀ (Except type material).

G. colchidaria objectaria Staudinger, 1892

1 ♂, 1 ♀, [Iran] Golestan, Park-e Melli-e Golestan, Koylar, 1250 m, 23.VII.1996, [leg.] Ebra.[himi], Naz.[ari] V., gen. preps 135 & 265/2005 H. R.; 4 ♂, 2 ♀, [Iran] Golestan, P.M. Golestan, Sulgerd, 1150 m, 8.V.1999, [leg.]

Mogh.[adam], Bar., Man.[zai], gen. preps 132, 134, 266, 267, 359 & 360/2005 H. R.; 1 ♂, [Iran] Shahrud, Kalpush, 1300 m, 25.-26.8.1982, [leg.] Hashemi, gen. preps 231/2005 H. R.; 1 ♂, [Iran] Shashrud, Kalate-Amirieh, 1550 m, 30.5.1982, [leg.] Hashemi, gen. preps 241/2005 H. R.; 2 ♂, [Iran] Khorassan, Dargaz, Tandureh, Shekarab, Chelmir, 1950 m, 18.-19.VII.1997, [leg.] Mirz.[ayans], Naz.[ari] V., gen. preps 131 & 358/2005 H. R.; 3 ♂, 3 ♀, [Iran] Khorassan, Neishabur, Zabarkhan Hesar, 1400 m, 12.6.1977, [leg.] Pazuki, Abai, gen. preps 108, 356, 357 & 734/2005 H. R.; 1 ♂, 1 ♀, [Iran] Khorassan, 10 Km S Sabzevar, Hares-abad, 940 m, 15.6.1977, [leg.] Pazouki, Abai, gen. prep. 107/2005 H. R.; 1 ♂, [Iran] Khorassan-e Shomali, Bojnurd, Eizman, 17.05.2005, [leg.] Fal.[safi], Nem.[ati] gen. prep. 133/2005 H. R.; 1 ♂, [Iran, Khorassan] Akhlamad, 13.7.1971, [leg.] Paz.[ouki], Ayat, gen. prep. 296/2005 H. R.; 1 ♂, 1 ♀, [Iran] Khorassan, N Binaloud Mt., 1800 m, 11.-12.VIII.1993, [leg.] Ebra.[himi], Badii, gen. prep. 109/2005 H. R.; 1 ♂, [Iran, Khorassan] Goutchan [Quchan], 30.7.1971, [leg.] Paz.[ouki], Ayat, gen. prep. 298/2005 H. R., all in HMIM. 2 ♀, Ashkabad, gen. preps 883 & 884/2009 H. R.; 1 ♀, Knldja, SEM preparation no. 32/2010 H. R.; 9 ♂, Pakistan, Northwestern Frontier prov. S. Waziristan, nr. Tanai Vill., 1500-2500 m, 28.vii.-12.viii.2005, leg. V. Gurko., gen. preps 794, 795, 796, 797, 800, 801, 939, 940 & 941/2009 H. R.; 8 ♂, Pakistan, Balochistan, Ziarat national Park forest, 2200 m, 23.-26.viii.2008, leg. V. Gurko, gen. preps 949, 950, 951, 952, 953, 954, 955 & 957/2010 H. R.; all in ZFMK. 27 ♂, 3 ♀, Iran NE, Kopet Dag, prov. Khorassan, ca. 50 km N Bojnurd, S Izman Sufla, N37°44'20", E057°25'53", 1240 m NN, 18.05.2005, leg. Trusch, Petschenka, Müller, gen. preps 390, 391, 392, 525, 528, 529, 530, 531, 687, 688, 689, 690, 691, 692, 693, 694, 695, 697, 698, 699, 700, 881 & 882/2009 H. R., SEM prep. nos ♂ 9 & 10/2010 H. R.; 1 ♂, [Iran, Khorassan] Akhlamad, 13.7.1971, [leg.] Paz.[ouki], Ayat; 1 ♂, Iran: prov. Mazandaran, Elburz mts., S Shah Kuh-e Bala, 2400 m NN, N36°33', E054°36', 19.07.2003 (lux), leg. G. Ebert & Trusch gen. prep. 387/2009 H. R.; 10 ♂, Iran N, prov. Semnan, 30 km NW Damghan, Cheshmeh Ali, N36°15'07", E 054°04'20", 1560 m NN, 24.05.2005, leg. Trusch, Petschenka, Müller, gen. preps 532, 533, 534, 701, 702, 703, 704, 705, 706/2009 H. R.; 4 ♂, Afghanistan, Arghandab Dam, 23.05.1975, gen. preps 590, 591, 592 & 593/2009 H. R. SEM prep. nos ♂ 11 & 12/2010 H. R.; 1 ♂, Pakistan, Baluchistan, Quena [Quetta] prov. 67°13'E 30°06'N, 2000 m, 22.June.1992, leg. Z. Weldenhoffer, gen. prep. 618/2009 H. R., all in SMNK. 1 ♂, Turkmenistan, Kopet-Dagh mts. 6 km W of Germob, Kurkulab, 850 m, No. L89, 19.IV.1993, N 38°04' E 057°50', leg. M. Hreblay, Gy. Laszlo and A.Podlussany, gen. preps 825 & 826/2009 H. R.; in PCMS; 1 ♂, Turkmenistan, Kopet-Dagh mts. 6 km S of Ipay-Kala, 1500 m, N 38°17' E 057°07', 16.-23.VIII.1992. No., L74, leg. M. Hreblay, Gy. Laszlo and G. Ronkay, gen. prep. 824/2009 H. R.; 1 ♂, Turkmenistan, Kopet-Dagh mts. 400-600 m, Firyuza, N 37°59' E 058°05', 25.6.1992. No. L56, leg. Gy. Fabian, B. Herczig, A.Podlussany and Z.Varga, gen. prep. 823/2009 H. R.; 1 ♂, Turkistan, Jei-gebiet, leg. R. Tanere, Staatssamlg. München, gen. prep. 827/2009 H. R.; 1 ♂, Turkmenistan SW Kopetdag, Sumbar riv. Val. Durdykhan vil. 1995.05.01-02, leg. Miatleuski J., gen. prep. 828/2009 H. R.; 1 ♂, Turkistan, Kara-Kala, 91 05 10, leg. Berg, gen. prep. 830/2009 H. R.; 1 ♂, Turkmenia S, Ashkhabad env. 17.-21.04.1991, leg. Berg, gen. prep. 831/2009 H. R.; 2 ♂, Iran, Khorasan [Golestan] NP. Golestan, Dasht, 1138 m, 21.-22.5.2001, 37,17,8325/5,56,836, leg. Dr. Ch. Wieser, gen. preps 807 & 808/2009 H. R.; 1 ♂, Iran, prov. Khorasan, Mt. Kopet Dag, Garmab district, 800 m, 1.VI.1999, leg. Kalman Gasko, [coll. M.Sommerer (München)], gen. prep. 809/2009 H. R.; 1 ♂, Turkmenia SE, Serahs 05/93, leg. Naglis, gen. prep. 829/2009 H. R.; 2 ♂, SW Afghanistan, 35 km ndl. Kandahar, Arghandab Dam, 1150 m, 23.-27.V.1961, leg. G. Ebert, Staatssamlg. München, gen. prep. 819 & 820/2009 H. R.; all in ZSM. 1 ♂, [Turkmenistan, Kopet-dagh] Igdedjik [Igdedzhik] 6 km NW Kara-Kala, [1]953 leg.Kuznetzov, gen. prep. 785/2009 H. R.; in ZISP. 1 ♂, [Turkmenistan, Kopet Dag] Igdedjik [Igdedzhik], 6 km NW Kara-Kala, [1]953, [leg.] V. Kuznrtzov, 10.5.1953, Gen. prep. 785/2008 H. R.; 1 ♀, [Turkmenistan, Kopet Dag] Igdedjik [Igdedzhik], 6 km NW Kara-Kala, [1]953, [leg.] V. Kuznrtzov, 7.4.1953, both in ZISP.

Total number of specimens studied: 93 ♂, 15 ♀ (Except type material).

***G. colchidaria sinesevida* Wehrli, 1941**

1 ♂, 1 ♀, [Iran], Esfandaghe-djiroft, 28.4.1971, [leg.] Saf.[avi], Zair, gen. preps 304, 305/2009 H. R.; 1 ♂, 1 ♀, [Iran] Khuzestan, Yassoudj, Sisakht, 2250 m, 13.6.1972, leg. Ebert, Pazuki, gen. preps 290 & 335/2005 H. R.; 1 ♂, 1 ♀, [Iran, Fars] Miandjangan, 12.9.1971, [leg.] Broom.[and], gen. preps 103 & 327/2005 H. R.; 2 ♂, 2 ♀, [Iran] Fars, Lake Bakhtegan, 1540 m, 31.5.1990, [leg.] Ebra.[himi], Badii, gen. preps 219 & 220/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars: Kazeroun, Noudan, 1100 m, 13.9.1974, [leg.] Pazouki, Haschemi, gen. preps 211 & 212/2005 H. R.; 3 ♂, 2 ♀, [Iran] Fars, Firuzabad. Muk, 1800 m, 8.-9.5.1985, [leg.] Mirz.[ayans], Hash.[emi], gen. preps 189, 190, 223, 224 & 732/2009 H. R.; 2 ♂, 1 ♀, [Iran] Fars, Schiraz, Kam-Firouz, 1750 m, 5.9.1974, [leg.] Pazouki, Hashemi, gen. preps 191, 192 & 198/2005 H. R.; 2 ♂, [Iran] Fars, Schiraz, Sivand, 1700 m-10 km N Sivand,

15.5.1974, [leg.] Abai, Paz.[ouki], gen. prep. 348/2005 H. R.; 2 ♂, 1 ♀, [Iran, Fars] Firuzabad, Mehkuyeh, 1450 m, 11.6.1986, [leg.] Mirz.[ayans], Hash.[emi], gen. prep. 176/2005 H. R.; 1 ♂, [Iran] Fars, Yassudj, Tanguh [Tangeh]-Sorkh, 2200 m, 9.9.1974, leg. Pazouki, Haschemi, gen. prep. 199/2005 H. R.; 1 ♂, [Iran, Kerman], Jiroft, 30 Km NE Jiroft-Saghdar, 1650 m, 17.6.1977, [leg.] Safavi, Pazouki, gen. prep. 111/2005 H. R.; 2 ♂, 2 ♀, [Iran] Fars, Lar, Park-e Shohada, 830 m, 26.X.1997, [leg.] Mogh.[addam], Naz.[ari], Bar.[oumand], gen. preps 195 & 196/2005 H. R.; 1 ♂, [Iran], Fars, Arsanjan, Saadatshahr, 1880 m, 7.VI.1996, [leg.] Safz.[Sarafrazi], Badii, gen. prep. 213/2005 H. R.; 1 ♂, [Iran] Fars, Kazerun, Chenar shahjani, 13.-21.9.1976, [leg.] Abai L-T, gen. prep. 205/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Kamfiruz, Tang-e Bostanak, 1650 m, 8.-9.VI.1996, [leg.] Safz.[Sarafrazi], Linna., Badii, gen. preps 187 & 188/2005 H. R.; 1 ♂, [Iran] Fars, Shiraz, Maharlu Lake, 1500 m, 23.IV.1992, [leg.] Badii, Mirz.[yans], gen. prep. 226/2005 H. R.; 1 ♂, S Iran, [Fars] 42 km wnw Djahrom, 1300 m, Asteragalus-Steppe, 26.3.1973, [leg.] M. Abai, gen. prep. 352/2005 H. R.; 2 ♂, [Iran] Fars, Darab, Karsia, 1153 m, 28.5.1973, [leg.] Hash.[emi], Zairi, gen. prep. 186/2005 H. R.; 1 ♂, [Iran] Fars, Kazerun, 970 m, 10.X.1994, [leg.] Abai, gen. prep. 214/2005 H. R.; 1 ♂, [Iran] Hormozgan, Bandar-e Charak, Berkeh Doka, 50 m, 28.V.2001, [leg.] Ebra.[himi], Mof.[idi], Osten, gen. prep. 137/2005 H. R.; 2 ♂, 1 ♀, [Iran] Hormozgan, Hajiabad, 1140 m, 25.IV.1996, [leg.] Ardeh, Badii, Naz.[ari]V., gen. prep. 136/2005 H. R.; 1 ♂, [Iran, Hormozgan] Minab-Djiroft, 23.4.1971, [leg.] Saf.[avi], Zairi, gen. prep. 106/2005 H. R.; 1 ♂, [Iran, Hormozgan] Gohreh (B.A.), 750 m, 10.3.1971, [leg.] Ayat., Paz.[ouki], gen. prep. 310/2005 H. R.; 1 ♂, [Iran] Kerman, Bam, Dehbakri, 2200 m, 1.-2.5.1973, [leg.] Broum.[and], gen. prep. 307/2005 H. R.; 1 ♂, [Iran] Kordestan, Marivan, Miandagh, 2000 m, 6.7.1972, leg. Mirz.[ayans], Abai, gen. prep. 343/2005 H. R.; 1 ♂, 2 ♀, [Iran] Kordestan, Ravansar, 22.7.1978, [leg.] Haschemi, Zairi, gen. preps 370 & 371/2005 H. R.; 2 ♂, [Iran] Hamadan, Nahavand, Gamasiab, 1750 m, 24.VIII.1995, [leg.] Mirz.[ayans], Badii, gen. preps 284 & 372/2005 H. R.; 2 ♂, [Iran, Kordestan], Marivan, 3.8.1967, [leg.] Dez., gen. prep. 112/2005 H. R.; 1 ♂, [Iran] Kermanshah, Bidsorkh, 1420 m, 11.VIII.1996, [leg.] Parch., Bar., Naz.[ari], gen. prep. 169/2005 H. R.; 1 ♂, 1 ♀, [Iran] Kermanshah, Bisotun, 21.7.1978, [leg.] Hashemi, Zairi, gen. preps 171 & 172/2005 H. R.; 1 ♂, 1 ♀, [Iran] Kermanshah, Dalahu, Rijab, 1050 m, 16.VIII.1996, [leg.] Parch, Bar., Naz.[ari], gen. preps 245 & 246/2005 H. R.; 1 ♂, [Iran, Kermanshah], Ghasr-shirin, 3.9.1951, [leg.] Vak., gen. prep. 336/2005 H. R.; 1 ♂, 1 ♀, [Iran] Khouzestan, Dezful, Baladie, 400 m, 1.VI.1998, [leg.] Mof.[idi], Ebra.[himi], gen. preps 235 & 124/2005 H. R.; 1 ♂, 1 ♀, [Iran] Kohkiluyeh- Boyerahmad, Sepidan, Margoon Fall, 2020 m, 23.-25.VI.1993, [leg.] Mirz.[ayans], Badii, gen. preps 116 & 248/2005 H. R.; 2 ♂, [Iran] Kohkiluyeh, Sisakht, 2100 m, 16.6.1986, [leg.] Mirz.[ayans], Hash.[emi], gen. preps 119 & 250/2005 H. R.; 1 ♂, [Iran] Baluchestan [Baluchestan], Khasch, Kousche, 2000 m, 21.-5.1972, [leg.] Abai, Ebert, gen. prep. 291/2005 H. R.; 1 ♂, [Iran] Baluchestan [Baluchestan], Khasch, Kuhe-Taftan, E-exp., 1800 m, 20.5.1972, [leg.] Abai, Ebert, gen. prep. 292/2005 H. R.; 1 ♂, [Iran] Tehran, Parchin, 40 Km E of Tehran, 26.5.2005, River bank with mixed trees, bushes and herbaceous plants, [leg.] Fibiger, Zahiri, gen. prep. 238/2005 H. R.; 1 ♂, [Iran, Tehran] Karadj, 09.06.1969, [leg.] Babai, gen. prep. 299/2005 H. R.; 1 ♂, 1 ♀, [Iran] Gilan, Lowshan, Bivarzin, 900 m, 27.-28.V.1997, [leg.] Badii, Naz.[ari], Safz.[Sarafrazi], gen. preps 165 & 166/2005 H. R.; 1 ♂, [Iran] Gilan, Roodbar, 320 m, 26.VI.1997, [leg.] Bar., Mof.[idi], gen. prep. 234/2005 H. R.; 1 ♂, 1 ♀, [Iran] Esfahan, 35 km N Maimeh [Meimeh], 2050 m, 6.8.1978, [leg.] Pazouki, Broumand, gen. preps 274 & 275/2005 H. R.; 1 ♂, [Iran, Esfahan], Kashan, Mashad Ardehal, 1600 m, 25.7.1981, [leg.] Hashemi, gen. prep. 126/2005 H. R.; 1 ♂, [Iran] Kermanshahan, Kermanshah, 18.6.1975, [leg.] Abai L.T., gen. prep. 242/2005 H. R.; 1 ♂, [Iran] Lorestan, Aligudarz, Ghali Kuh, 2500 m, 21.-22.VIII.1994, [leg.] Mirz.[ayans], Saraf.[avi], gen. prep. 262/2005 H. R.; 1 ♂, [Iran] Lorestan, 28 km O Borubjerd [Borujerd], Zalian Pass, 2300 m, 27.7.1975, [leg.] Pazouki, gen. preps 314 & 317/2005 H. R.; 1 ♂, 3 ♀, [Iran] Lorestan, Dorud, Darbastaneh, 1750 m, 4.VIII.1997, [leg.] Bar., Mof.[idi], gen. preps 254, 256 & 258/2005 H. R.; 4 ♂, 1 ♀, [Iran] Lorestan, 15 km O Dorud, Sarawand-Darastaneh, 2000 m, 6.8.1975, [leg.] Pazouki, gen. preps 260, 320, 321, 361 & 362/2005 H. R.; 1 ♂, [Iran] Kohkiluyeh, 20 km Yassouj-Ardakan, 2380 m, Tange-Sorkh, 16.8.1978, [leg.] Paz.[ouki], Bor. gen. prep. 117/2005 H. R.; 1 ♂, [Iran] Lorestan, Oshtorankuh, Kogah, 2350 m, 30.7.1975, [leg.] Pazouki, gen. prep. 313/2005 H. R.; 1 ♂, [Iran] Esfahan: Semirom; Ab-malakh, 1600 m, 7.9.1971, [leg.] Ebrahimi, Badii, gen. prep. 268/2005 H. R.; 1 ♂, [Iran] Esfahan, Natanz, Lakaj, 1850 m, 5.VI.1998, [leg.] Mof.[idi], Ebra.[himi], gen. prep. 272/2005 H. R.; 1 ♂, 1 ♀, [Iran] Azarbayjan, Siahchaman, 1600 m, 15.7.1976, [leg.] Pazouki, Broumand, gen. preps 377 & 378/2005 H. R.; 1 ♂, [Iran] Markazi, Ashtian, Ahu, Darreh-e Bidsukhteh, 2000 m, 29.VII.1997, [leg.] Bar., Mof.[idi], gen. prep. 279/2005 H. R.; 1 ♂, [Iran] Kermanshahan, 38km S Shahabad, Ghaladjeh paas, 1880 m, 13.07.1975, [leg.] Pazouki, gen. prep. 366/2005 H. R.; 1 ♂, [Iran] Ilam, Dareshahr, Kolm-e-Bala, 950 m, 3.VIII.2004, [leg.] Gh./Nem.[ati], gen. prep. 281/2005 H. R.; 2 ♂, 2 ♀, [Iran] Fars, Kazeroun, Mian-Kotal, 1900 m, 11.6.1972, Mi.Li., [leg.] Ebert, Pazouki, gen. preps 326, 328, 329 &

350/2005 H. R.; 1 ♂, 2 ♀, [Iran] Khouzestan, Yassoudj, Sisakht, 2250 m, 13.6.1972, [leg.] Ebert, Pazouki, gen. preps 334 & 349/2005 H. R.; all in HMIM. 1 ♂, Iran, Fars, Strasse Ardekan-Talochosroe Come, 2600 m, VII.1937, coll. Brandt, Wehrli gen. gen. prep. 7408; 1 ♂, Iran, Fars, Strasse Kazeroun-Bouchir Tchouroum, ca. 1000 m, 26.Mars.-6.April 1937, coll. Brandt, Wehrli gen. gen. prep. 7406; 2 ♀, Iran, Fars, Strasse Chiraz-Kazeroun, Fort Sine-Sefid, ca. 2200 m, 30.4.1937 and [1 ♀] at 2-4.5.1937, coll. Brandt, gen. preps ♀ 900/2009 H. R.; SEM preparation no. ♀ 21 /2010 H. R.; all in ZFMK. 5 ♂, 10 ♀, S Iran, [Fars] Strasse Schiraz-Kazerun, Imam Sade, 1200 m, 3.6.1969, leg. G. Ebert, gen. preps 502 & 730/2009 H. R.; 1 ♂, S Iran, Tange Tchogan, 930 m, 30 km n Kazerun, 23.3.73, leg. H.G. Amsel, gen. prep. 492/2009 H. R.; 18 ♂, 11 ♀, S Iran, Fars, Abadeh, 3 km S Deidegan, 1900 m, 20.6.1972, leg. Ebert & Falkner, gen. preps 486, 400, 401, 728 & 872/2009 H. R., SEM prep. no. ♀ 35/2010 H. R.; 38 ♂, 49 ♀, S Iran, Miyan Kotal, 1900 m östl. Kazerun 51°40'öl, 29°30' nB., 4.-7.6.1969, leg. G.Ebert, gen. preps 495, 501, 503, 504, 505 & 787/2009 H. R.; 10 ♂, 2 ♀, Iran, prov. Fars, S Zagross, 5 km NE of Saidatshahr, 09.-10.06.2005, leg. P.Gyulai & A. Garai, gen. preps 506 & 934/2009 H. R.; 2 ♂, 6 ♀, Iran, Fars, Shiraz, ESE, Darab N (Pass), 1850-2100 m, 19.5.2005, [11/05], leg. T. & A. Hofmann, gen. preps 515 & 516/2009 H. R.; 14 ♂, 11 ♀, Iran, prov. Fars, S Zagross, 40 km SW of Sivand, 09.-10.06.2005, leg. P. Gyulai & A. Garai, gen. preps ♂ 512, 513, 935, 936, 937, 966, 967, 968 & 969, ♀ 874 /2009 H. R.; 1 ♂, 1 ♀ Iran, prov. Fars, S-Zagros, 40 km SW of Sivand, 09.-10.06.2005, leg. P. Gyulai & A. Garai, gen. preps ♂ 936, ♀ 874/2010 H. R.; 1 ♂, 4 ♀, S Iran, [Fars] Dalaki-Brücke, 300 m, 21.3.1973, leg. H. G. Amsel, gen. prep. 487/2009 H. R., SEM prep. no. ♀ 36/2010 H. R.; 1 ♂, 1 ♀, S Iran, Fars, Daschte Ardjan, Kotal-Pirehsan, 2000 m, 18.6.1972, leg. Ebert & Falkner, gen. prep. 488/2009 H. R.; 20 ♂, 3 ♀, Iran, Balutschestan, Khasch 3 km SE, Eskal-Abad, 1700 m, 12.5.1972, leg. Ebert & Falkner, gen. preps 423, 424, 425 & 426/2009 H. R.; 1 ♂, 2 ♀, [Iran] Balutschestan [Baluchestan], 18 km W Iran-Schahr, Rig-kaboud, 500 m, 15.5.1972, leg. Abai, Ebert, gen. prep. 446/2009 H. R.; 13 ♂, 10 ♀, Iran, Balutschestan, Khasch, 3 km S Sangan, 1550 m, 19.5.1972, leg. Ebert & Falkner, gen. preps 427, 428, 429, 432 & 436/2009 H. R.; 12 ♂, 9 ♀, Iran, Balutschestan, Khasch, 18 km NE Karvandar, 1400 m, 14.5.1972, leg. Ebert & Falkner, gen. preps 443, 444 & 445/2009 H. R.; 23 ♂, 6 ♀, Iran, Balutschestan, Khasch, Guscheh, Kuhe Taftan, W-exp., 2000 m, 21.5.1972, leg. Ebert & Falkner, gen. preps 449, 450, 451, 452, 453 & 454/2009 H. R.; 70 ♂, 29 ♀, Iran, Balutschestan, Khasch, 11km NE Karvandar, 1300 m, 13.5.1972, leg. Ebert & Falkner, gen. preps 394, 395, 437, 438, 439 & 440/2009 H. R., SEM prep.no. 1/2010 H. R.; 11 ♂, 27 ♀, S Iran [Hormozgan] Bandar-Abbas, km 107 d. strasse nach sirdjain, 850 m, 7.3.1973, leg. G. Ebert, gen. preps 464, 466, 722 & 723/2009 H. R.; 1 ♂, S Iran, strasse Bandar-abbas-Sirjan, km 24, 250 m, 2.4.1973, leg. H. G. Amsel, gen. prep. 718/2009 H. R.; 14 ♂, 11 ♀, N Iran, Elburs mts., prov. Tehran, Arangeh 25 km N Karadj, 1550 m, 1.-6.6.1972, leg. Ebert & Falkner, gen. preps 383, 384, 388 & 477/2009 H. R.; 1 ♂, 5 ♀, N Iran, Elburs mts., S Rand, Tehran-Evin, 1600 m, 30.6-5.7.1972, leg. Ebert & Falkner, gen. preps 393 & 473/2009 H. R.; 1 ♂, N Iran, Elburs mts., S Rand-Tehran, Evin, 70 km, salt see, 26.5.1972, leg. G. Ebert, gen. prep. 479/2009 H. R.; 1 ♂, 2 ♀, N Iran, Elburs mts., S Rand-Tehran, Evin, 1800 m, 25.-28.6.1972, leg. Ebert & Falkner, gen. prep. 721/2008 H. R.; 1 ♂, 1 ♀, N Iran, Elburs-Geb., Shemshak, 1700 m, 20.6.1969, leg. H. G. Amsel, gen. prep. 727/2008 H. R.; 3 ♂, N Iran, 70 km s Tehran, 1300 m, 29.5.1969, leg. G.Ebert, gen. preps 480 & 481/2009 H. R.; 5 ♂, 9 ♀, W Iran, Kordestan, 95 km N Kermanschah, Starsse nach Sanandaj, 1350 m, 11.7.1975, leg. Ebert & Falkner, gen. preps 563 & 564/2009 H. R., 2 ♂, [Iran, Kordestan] Marivan, 4.VIII.1967, [leg.] Dez., gen. preps 569 & 570/2009 H. R., 6 ♂, 16 ♀, W Iran, Kordestan, Strasse Zandjan-Bijar, 53 km S Zandjan, 1700 m, 28.-29.06.1975, leg. Ebert & Falkner, gen. preps 565, 566, 567 & 568/2009 H. R.; 1 ♂, 1 ♀, [Iran] Kordestan, Marivan-Miandagh, 2000 m, 6.7.1972, leg. Mirz.[ayans], Abai, gen. prep. 571/2009 H. R.; 3 ♂, 4 ♀, W Iran, Kordestan, Strasse Saghez- Baneh, 21 km, NE Baneh, 1950 m, 30.-2.7.1975, leg. Ebert & Falkner, gen. preps 572 & 573/2009 H. R.; 4 ♂, 2 ♀, W Iran, Kordestan, 90 km N Kermanschah, Strasse nach Sanandaj, 1420 m, 11.7.1975, leg. Ebert & Falkner, gen. preps 574 & 575/2009 H. R.; 7 ♂, 3 ♀, [Iran] Khouzestan, Yassoudj, Sisakht, 2250 m, 13.6.1972, leg. Ebert, Pazouki, gen. preps 396, 397, 58, 1582 & 583 /2009 H. R., SEM prep. no. ♀ 37/2010 H. R.; 1 ♂, S Iran, prov. Khuzestan, Yasudj, Sisakht, 50 km NW, 15.-18.Juni.1975, leg. Ebert & Falkner, gen. prep. 588/2009 H. R.; 9 ♂, W Iran, Kermanshahan, Ghalladje Pass, 40 km S Schahabad, 1880 m, 13.7.1975, leg. Ebert & Falkner, gen. preps 714 & 715/2009 H. R.; 8 ♂, 7 ♀, W Iran, 15 km nördl. Kermanschah, 1350 m, 16.6.1975, leg. Amsel, gen. preps 579, 580 & 948/2009 H. R.; 1 ♂, W Iran, Kermanschahan, Dschahar Sebar, 43 km, SW Kermanschah, 1650 m, 12.7.1975, leg. Ebert & Falkner, gen. prep. 576/2009 H. R.; 2 ♂, [Iran], Esfandaghe-djiroft, 28.4.1971, [leg.] Saf.[avi], Zair, gen. preps 461 & 462/2009 H. R.; 19 ♂, 17 ♀, W Iran, Lorestan, 14 km E Dorud, 1990 m, 6.8.1975, leg. Ebert & Falkner, gen. preps 535, 536, 537, 538, 539 & 540/2009 H. R.; 20 ♂, 9 ♀, W Iran, Lorestan, Dorud, 5 km SE Saravand, „Kohyeh” 2300 m, 29.-30.7.1975, leg. Ebert & Falkner, gen. preps 544, 545, 546, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682,

683, 684 & 685/2009 H. R.; 3 ♂, 2 ♀, W Iran, Lorestan, Dorud, 4 km SE Saravand "Nermyeh" 2400 m, 4.-6.8.1975, leg. Ebert & Falkner, gen. prep. 543/2009 H. R.; 1 ♂, W Iran, Lorestan, 28km E Borudjerd, 2300 m, 27.7.1975, leg. Ebert & Falkner, gen. prep. 542/2009 H. R.; 1 ♂, W Iran, Lorestan, Dorud, Daryache Gahar, 2400 m, 31.7.1975, leg. Ebert & Falkner, gen. prep. 541/2009 H. R.; 2 ♀, S-Iran, Khusestan, 15 km SE Yassudj, 2050 m, 15.6.1972, leg. Ebert & Falkner; 2 ♂, 3 ♀, S-Iran, prov. Khuzestan, Yasudj, Sisakht, 50 km NW, 15.-18.Juni.1975, leg. Ebert & Falkner, gen. preps 584, 586 & 588/2009 H. R.; 2 ♂, 3 ♀, S Iran, Fars, Kaserun, Mian-Kotal, 1900 m, 11.6.1972, leg. Ebert & Falkner, gen. preps 483 & 484/2009 H. R.; 1 ♂, same locality 4.-7.6.1969, 51°40' ö, 29°30' nB, leg. G. Ebert, gen. prep. 787/2009 H. R.; 3 ♂, 6 ♀, S Iran, prov. Fars, Tange Surkh, 50 km NW Ardekan, 2250 m NN, 12.-15.Juni.1975, leg. Ebert & Falkner, gen. preps 518, 522, 710, 706 & 786/2009 H. R., SEM prep. no. ♀ 38/2010 H. R.; 1 ♂, Iran, Fars, Eqlid, SSE, Kuh-e Bol, Darre Adsad, 2700-3000 m, 7.6.2005, [31/05], leg. A. Hofmann & J. U. Meineke, gen. prep. 523/2009 H. R.; 1 ♂, 2 ♀, Iran, Fars, Yasuj E, Islamiyeh, Deshkard E, 2340-2360 m, 8.6.2005, [32/05], leg. A. Hofmann & J. U. Meineke, gen. preps ♂ 517 & ♀ 901/2009 H. R.; 9 ♂, 1 ♀, Iran, prov. Boyerahmad-va-Kohgiluyeh, SE Zagross, 35km SE of Yasuj, 2600 m, 06.-07.06.2005, leg. P. Gyulai & A. Garai, gen. preps 555, 556, 558, 788, 789 & 790/2009 H. R.; 3 ♂, 1 ♀, Iran, prov. Boyerahmad-va-Kohgiluyeh, SE Zagross, Kuh-e-Dena, 2450 m, 5 km SW of Sisakht, 04.-05.06.2005, leg. P. Gyulai & A. Garai, gen. preps 791, 792 & 793, /2009 H. R.; 9 ♂, 2 ♀, Iran, prov. Azerbayejan E-Sharghi, 10 km NW of Miyane, 31.05.-01.06.2005, leg. P. Gyulai & A. Garai, gen. preps 547, 549, 550, 559, 661, 662, 663, 664 & 666, SEM preparation no. ♀ 34/2009 H. R.; 3 ♂, 4 ♀, [same loc. and leg.] 14.-15.6.2005, gen. preps 551, 669 & 670 /2009 H. R.; 5 ♂, 1 ♀, Iran, Chaharmahal-va-Bakhtiyari, Borujen, S Dorahun, 6km S, 1850-2100 m, 1.6.2005, leg. A. Hofmann & J. U. Meineke, gen. preps ♂ 559 783 & 784/2009 H. R.; 1 ♂, Iran, prov. Chahar Mahal, Zagross mts., NW Samsami, 2800 mNN, N32°09', E050°11', 13.07.2003 (lux), leg. G. Ebert & Trusch, gen. prep. 389/2009 H. R.; 1 ♂, Iran, Bandar-Abbas, km 107 d. Strasse nach Sirdjan, 850 m, 7.3.1973, leg. G. Ebert, SEM preparation no. 2/2010 H. R.; 1 ♀, W-Iran, 15 km nördl. Kermanshah, 1350 m, 16.6.1975, leg. H. Amsel, gen. prep. 948/2010 H. R.; all in SMNK. 1 ♂, Iran, Fars, 30 km N Persepolis 1.V.1975, leg. W. Thomas, gen. prep. 816/2009 H. R.; 1 ♂, Iran, prov. [Azarbayejan e] Sarqi, 5 km W of Halhal [Khalkhal], 1400 m, 10.V.2000, leg. Szabo & Hentschel, gen. prep. 818/2009 H. R.: both in PCMS. 2 ♂, S Iran, Hormozgan, Beshagerd Mts., Angohran vil. N26°27' E 057°54', 25.-26.3.2000, leg. Victor Siniaev, gen. preps 805 & 806 /2009 H. R.; 1 ♂, Iran, Belutschistan, Sangan, 1650 m, östl. Kuh i Taftan, 4.-18.VI.1954, leg. W. Richter, gen. prep. 813/2009 H. R.; 1 ♂, N. Iran, S Elburs, Varamin, 700 m-Semidesert, 11.-21.7.1996, leg. Müller, gen. prep. 810/2009 H. R.; all in ZSM. 1 ♂, Iran, Fars prov., Estahban to Sarvestan road, 20 km to Sarvestan, after Ab Asemani village, N29°05'51" E 053° 26'12", 1890 m, 22.May.2009, Biotop with Amygdalus bushes, leg. H. R., gen. prep. 749/2009 H. R.; in coll. H. Rajaei. 1 ♂, Iran, prov. Busher, Kangan Umg. Strasse Dorahak-Velayat, 871 m, N 27°59'50.6" E 52°00'44.5", 03.-04.01.2008 LF/KF, leg. Lehmann, Stadie, Zahiri, gen. prep. 988/2010 H. R.; in PCDS.

Total number of specimens studied: 481 ♂, 330 ♀ (Except type material).

***G. irakensis* Wehrli, 1938**

1 ♂, Asia min. Malatya, Tecde, 30.V., gen. prep. 989/2010 H. R.; 1 ♂, 1 ♀, [Iran] W Azarbayjan, 15 km Rezaieh [Uromiyeh], 1410 m, 10.-11.6.1975, [leg.] Abai L.T., gen. preps 373 & 374 /2005 H. R.; 2 ♂, 2 ♀, [Iran] W Azarbayjan, Marmishou, 1760 m., alt. Iran-Turkey Border, N 37°34'26", E 44°37'25", (River bank with Salix trees, Bushes & Herbaceous plants) 18.VII.2005, [leg.] Zahiri, Khiaban, N., gen. prep. 130/2005 H. R.; 2 ♂, [Iran] Chaharmahal va Bakhtiari, Ardal, Dopolan Mashayekh, Helen forest, 1800 m, N31°53'50", E50°34'56", 23.VI.2005, [leg.] Zahiri, Nem.[ati]/ Fal.[safi], gen. preps 148 & 149/2005 H. R.; 1 ♂, 1 ♀, [Iran] Chaharmahal & Bakhtiari, Mavarz, Bazoft, 1450 m, 20.VIII.1995, [leg.] Mirz.[zayans], Badii, gen. preps 287 & 289/2005 H. R.; 1 ♂, 1 ♀, [Iran] Esfahan, Natanz, Abyaneh, 2200 m, 11.8.1988, [leg.] Hashemi, gen. preps 270 & 271/2005 H. R.; 1 ♂, 2 ♀, [Iran] Kordestan Paniran 23.7.1978, [leg.] Hashemi, Zairi, gen. prep. 113/2005 H. R.; 1 ♂, [Iran, Esfahan], Kashan, Niasar, Sericheh, 1650 m, 29.-31.7.1983, [leg.] Pazuki, Hashemi, gen. prep. 236/2005 H. R.; 1 ♂, [Iran] Hamedan, Rezan, 2100 m, 3.8.1987, [leg.] Mirz.[zayans], Hash.[emi], gen. prep. 282/2005 H. R.; 1 ♂, [Iran] Ghazvin, Rudbar-e Shahrestan, Falar, 1150 m, 25.VI.1994, leg. Ebra.[himi], gen. prep. 286/2005 H. R.; 1 ♂, [Iran] Ghazvin, Abgarm, 1500 m, 11.VIII.1997, [leg.] Bar, Mof.[idi] gen. prep. 285/2005 H. R.; 1 ♂, [Iran] Ilam, Chovar, Tang-e Dalab, 1200 m, 15.V.1997, [leg.] Safz.[Sarafrazi], Badii, Naz.[ari] V., gen. prep. 280/2005 H. R.; 1 ♂, [Iran] Kermanshahan, 45km. NW. Schahabad, Sorkhedizeh, 1320 m, 14.7.1975, [leg.] Pazouki, gen. prep. 340/2005 H. R.; 1 ♂, [Iran] Kerman; Baft, Ghanat-Marvan, 2800 m, 23.5.1977, [leg.] Safavi, Pazuki, Abai, gen. prep. 239/2005 H. R.; 1 ♂, 1 ♀ [Iran] E Tehran, Aivankay, Ahmad-abad, 1450 m., 26.5.1982, [leg.] Haschemi, gen. prep. 127/2005

H. R.; 2 ♂, [Iran] Markazi, Ashtian, Ahu-Darreh-e Bidsukhteh, 2000 m., 29.VII.1997, [leg.] Bar.[oumand], Mof.[idi], gen. preps 277 & 278/2005 H. R.; 1 ♂, [Iran] Lorestan, Oshtorankuh, Narmian, 2400 m, 4.-5.8.1975, [leg.] Pazouki, gen. prep. 315/2005 H. R.; 1 ♂, [Iran, Markazi] Ashtian, Ahmad abad, 2200 m, 19.7.1981, [leg.] Pazuki, Boroumand, gen. prep. 147/2005 H. R.; 1 ♂, [Iran] Tehran-Ghom, Karam-Chekan, 2050 m, 1.8.1988, [leg.] Hashemi, gen. prep. 125/2005 H. R.; 1 ♂, [Iran] Tehran, Firuzkuh, Chehel cheshmeh, 2000 m., 24.VI.1998, [leg.] Mof.[idi], gen. prep. 128/2005 H. R.; 1 ♂, [Iran, Tehran], Damavand, 2.8.1970, [leg.] Saf.[avi], Hash.[emi], gen. prep. 300/2005 H. R.; 1 ♂, [Iran] Fars, Sivand, 19.VI.1993, [leg.] Mirz.[ayans], Badii, gen. prep. 180/2005 H. R.; 1 ♂, 1 ♀, [Iran] Kohkiluyeh, 5 km N Meymand, NW Dena mt., 2210 m, 18.-20.8.1976, [leg.] Pazuki/ Broumand, gen. preps 118, 252 & 735/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars-Schiraz, 10 km N Sivand, 1150 m, 15.5.1974, leg. Abai., Paz.[ouki], gen. preps 104 & 183/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars-Schiraz, Bamu N.P., 1800 m, 8.6.1990, [leg.] Ebra.[himi], Badii, gen. preps 193 & 194/2005 H. R.; 1 ♂, [Iran] Fars, Fasa, Mianjangal, 1800 m., 4.VI.2001, [leg.] Ebra.[himi], Mof.[idi], Osten., gen. prep. 215/2005 H. R., all in HMIM. 1 ♂, Iran, prov. Fars, S-Zagros, 40 km SW of Sivand, 09.-10.06.2005, leg. P. Gyulai & A. Garai, gen. prep. 938/2010 H. R.; 1 ♂, S Iran, Fars, Abadeh, 3 km S Deidegan, 1900 m, 20.6.1972, leg. Ebert & Falkner, gen. prep. 399/2009 H. R.; 1 ♂, [Iran] Alvand, 2150 m, 20.7.38, leg. Dr. Wehrli Basel, gen. prep. 7266; 2 ♂, Iran, Fars, Strasse Chiraz-Kazeroun, Fort Sine sefid, ca. 2200 m, 2.5.1937, coll Brandt, gen. prep. 7407 Dr. Wehrli Basel, and gen. prep. 870/2009 H. R.; 2 ♂, Pakistan, Northwestern Frontier prov. S. Waziristan, nr. Tanai Vill., 1500-2500 m, 28.vii.-12.viii.2005, leg. V. Gurko., gen. preps 798, 799 & 942/2009 H. R.; 1 ♂, Pakistan, Balochistan, Ziarat national Park forest, 2200 m, 23.-26.viii.2008, leg. V. Gurko, gen. prep. 956/2010 H. R.; 1 ♂, 1 ♀, Iran, mer. occ. Kasrun, 900 m, Ende IV [19]38, gen. prep. 915/2010 ♂ H. R. (paralectotypes of *G. kasrunensis*); all in ZFMK. 4 ♂, 2 ♀, Iran, prov. Hamadan, 5 km SW Avadj pass to Razan 2500 m, 01.-02.06.2005, leg. P.Gyulai & A. Garai, gen. preps 457 & 458/2009 H. R.; 11 ♂, 5 ♀, Iran, prov. Hamadan, 8 km S of Arak, 02.-03.06.2005, leg. P.Gyulai & A.Garai, gen. preps 459, 460, 958, 959, 960, 961, 962, 908, 909 & 910/2009 H. R., SEM prep. no. ♀ 22 & 23/2010 H. R.; 13 ♂, N Iran, Elburs Geb. 12 km v. Keredj 1650 m, 12.6.1969, leg. G. Ebert, gen. preps 474, 475 & 476/2009 H. R., SEM prep. no. ♂ 7/2010 H. R.; 2 ♂, 4 ♀, N Iran, Elburs mts. S Rand-Tehran, Evin, 1600 m, 29.6.1972, leg. G. Ebert, gen. prep. 472/2009 H. R.; 1 ♂, [Iran, Tehran] Evin, 10.v.1967, [leg.] Barau.[mand], gen. prep. 482/2009 H. R.; 10 ♂, 5 ♀, N Iran, Elburs mts., prov. Tehran, Arangeh, 25 km N Karadj, 1550 m, 1.-6.6.1972, leg. Ebert & Falkner, gen. preps 470, 471, 478, 906 & 907/2009 H. R., SEM prep. no. ♂ 6 & 8/2010 H. R.; 2 ♂, W Iran, Kermanschahan, Dschahar Sebar, 43 km SW Kermanschah, 1650 m, 12.7.1975, leg. Ebert & Falkner, gen. preps 716 & 717/2009 H. R.; 9 ♂, 5 ♀, W Iran, Kermanschahan, Surkhe Dizah, 56 km NW Schahabad, 1320 m, 14.7.1975, leg. Ebert & Falkner, gen. preps 577 & 578/2009 H. R.; 3 ♂, 2 ♀, S Iran, prov. Khuzestan, Yasudj, Sisakht, 50 km NW, 15.-18.Juni.1975, leg. Ebert & Falkner, gen. preps 585 & 726/2009 H. R.; 6 ♂, Iran NE, Kopet Dag, prov. Khorassan, ca. 50 km N Bojnurd, S Izman Sufla, N37°44'20", E057°25'53", 1240 m NN, 18.5.2005, leg. Trusch, Petschenka, Müller, gen. preps 526 & 527, 686, 696/2009 H. R.; 2 ♂, NW Iran, 30 km südl Rezaiyeh [Uromiyeh], 1400 m, 10.6.1975, leg. H. G. Amsel, gen. preps 553 & 554/2009 H. R.; 1 ♂, Iran, prov. Chahar Mahal, Zagross mts. NW Samsami, 2800 m NN, N32°09' E050°11', 13.07.2003(lux), leg. Ebert & Trusch, gen. prep. 561/2009 H. R.; 2 ♂, Iran, prov. Boyerahmad-va-Kohgiluyeh, SE Zagross, 35 km SE of Yassuj, 2600 m, 06.-07.06.2005, leg. P. Gyulai & A. Garai, gen. prep. 557/2009 H. R.; 1 ♂, Iran, prov. Zanjan, 2350 m, W Alburz range, Tarom v., 20 km NE of Zanjan, 13.-14.06.2005, leg. P. Gyulai & A. Garai, gen. prep. 562/2009 H. R.; 3 ♂, 1 ♀, Iran, prov. Azerbaijan, E sharqi, 10km NW of Miyane, 14.-15.06.2005, leg. P. Gyulai & A. Garai, gen. preps 552 & 668/2009 H. R.; 4 ♂, Iran, Azarbaijan E (sharghi), 10km NW of Miyane 31.05.-01.06.2005, leg. P. Gyulai & A. Garai, gen. preps 660, 665 & 667/2009 H. R.; 1 ♂, S. Iran [Fars] 100 km S Abadeh, n Didegan, 2000 m, 9.6.1960, leg. G. Ebert, gen. prep. 493/2009 H. R.; 1 ♂, S Iran, Fars, Daschte Ardjan, Kotal-Pirehsan, 2000 m, 18.6.1972, leg. Ebert & Falkner, gen. prep. 524/2009 H. R.; 2 ♂, 2 ♀, S Iran, Fars, Kaserun, Mian-Kotal, 1900 m, 11.06.1972, leg. Ebert & Falkner, gen. prep. 485/2009 H. R.; 5 ♂, 4 ♀, S Iran, Strasse Shiraz-Kazerun, Imam sade, 1200 m, 3.6.1969, leg. G. Ebert, gen. preps 497 & 498/2009 H. R.; 3 ♂, Iran, prov. Fars, S Zagross, 5 km NE of Saidatshahr, 09-10.06.2005, leg. P. Gyulai & A. Garai, gen. preps 509 & 751/2009 H. R.; 1 ♂, W Iran, Kordestan, Strasse Baneh-Marivan, 25 km E Baneh, 1950 m, 4.7.1975, leg. Ebert & Falkner, gen. prep. 713/2009 H. R.; 1 ♂, N Iran, Kamard, 40 km W Tehran, ca. 1700 m, 9.9.1970, leg. G. Ebert, gen. prep. 719/2009 H. R.; 1 ♂, W Iran, Lorestan, Dorud, 5 km SE Saravand, "Kohyeh", 2300 m, 29.-30.7.1975, leg. Ebert & Falkner, gen. prep. 671/2005 H. R.; 1 ♂, Iran,[Tehran]Vanak, 15 km Nv Tehran, leg. E. & A. Vartian, gen. prep. 645/2009 H. R.; 2 ♂, O Afghanistan, Khurd Kabul, So.v. Kabul, 1900 m, 19.06.1969, leg. Ebert, gen. preps 624 & 626/2009 H. R.; 1 ♂, Iran, Vanak, 15km N v Tehran, leg. E. & A. Vartian, gen. prep. 645/2009 H. R., all in SMNK. 1 ♂, Iran, Fars, 30 km N Persepolis 1.V.1975, leg. W. Thomas, gen. prep. 817/2009 H. R.; 2 ♂,

Türkei, prov. Urfa, 2 km N of Halfeti, N 37°38' E 38°03', 6.-7.IV.1994, 400 m, leg. Csovári & Hreblay, gen. preps 837 & 838/2009 H. R.; 1 ♂, Iran, prov. Fars, 5 km S of Dehbid, 2040 m, 2.v.2000, leg. Szabo & Hentschel, gen. prep. 814/2009 H. R.; all in PCMS. 1 ♂, N. Iran, Ahmad Abad, Semidesert, 3100 m (licht) 21.-31.7.1996, leg. Müller, gen. prep. 811/2009 H. R.; 1 ♂, O Afghanistan, Sarobi, 1100 m, 5.VI.1961, leg. G. Ebert, Staatssamlg. München, gen. prep. 821/2009 H. R.; all in ZSM.

Total number of specimens studied: 137 ♂, 42 ♀ (Except type material).

***G. kasrunensis* Wehrli, 1939**

2 ♂, 3 ♀, [Iran] Fars, Kazerun, Cheshmenori, 900 m, 6.5.1985, [leg.] Mirz.[ayans], Hash.[emi], gen. preps 200, 201, 202 & 736/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Kazerun: Nowdan, 1250 m, 15.4.1975, [leg.] Broumand, gen. preps 209, 210/ 2005 H. R.; 2 ♂, 2 ♀, [Iran] Fars, Mian-Jangal, 40 km N. Fasa, 1700 m, 20-21.VI.1993, leg. Mirz.[zayans]/ Badii, gen. preps 181 & 182/2005 H. R.; 2 ♂, 2 ♀, [Iran] Fars, Firuzabad, Mehkuyeh, Eshkaft Barm, 1750 m, 21-22.VI.1993, [leg.] Mirz.[ayans], Badii, gen. preps 174 & 175/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Saadatshahr, 1650 m, 6.IV.1999, [leg.] Kal.[ali], Mof.[idi], gen. preps 221 & 222/2005 H. R.; 2 ♂, 2 ♀, [Iran] Fars-Farashband, Haratabad, 770 m, 7.5.1985, [leg.] Mirz.[ayans] & Hash.[emi], gen. preps 184 & 185/2005 H. R.; 1 ♂, [Iran] Fars, Takht-e Jamshid, 6.V.1996, [leg.] Ardeh, Badii, Naz.[ari] V., gen. prep. 197/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Shiraz, N. Sivand, 18.-19.VI.1993, leg. Mirz.[ayans] & Badii, gen. preps 177 & 178/2005 H. R.; 1 ♂, 1 ♀, S Iran, [Fars] Tange-tchogan, 930 m, 30 km n Kazerun, 32.03.1973, leg. M. Abai, gen. preps 330 & 331/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Kazerun, Tanguh-Tchogan, 09.05.1974, [leg.] Abai & Pazouki, gen. preps 227 & 230/2005 H. R.; 1 ♂, 1 ♀, [Iran, Fars] Kazerun, 5.7.70, [leg.] Saf.[avi], Hash.[emi], gen. preps 322 & 323/2005 H. R.; 3 ♂, 2 ♀, [Iran] Fars, Gaw koschak, 110 km. S. Shiraz, 24.7.1975, [leg.] Abai, gen. preps 207, 208, 308, 309 & 347/2005 H. R.; 2 ♂, 1 ♀, [Iran] Fars-Sivand, 1710 m, 9.6.1990, [leg.] Ebra.[himi], Badii, gen. prep. 229/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Dehbid, 2000 m, 15.VI.1996, [leg.] Safz.[Sarafrazi], Badii, gen. preps 217 & 218/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars-Schiraz, Nowdan, 1250 m, 17.5.1974, leg. Abai., Paz.[ouki], gen. preps 345 & 346/2005 H. R.; 1 ♂, 1 ♀, [Iran] Fars, Abadeh, 3 km S Didegan, 1900 m, 20.6.1972, leg. Ebert, Pazouki, gen. preps 324 & 325/2005 H. R.; 3 ♂, 2 ♀, [Iran] Hormozgan, Issin, Geno, 750 m, 25.4.1986, [leg.] Mirz.[ayans], Borum.[and], gen. preps 141, 142, 145, 151, 159/2005 H. R.; 2 ♂, [Iran] Hormozgan, Bandar Abbas, Hajiabad, 1050 m., 3.V.1996, [leg.] Badii, Ardeh, Nazari V., gen. preps 140 & 381/2005 H. R.; 2 ♂, 1 ♀, [Iran] Hormozgan, Geno Mt. 1550 m, 18.IV.1994, [leg.] Parch, Ebra.[himi], gen. preps 143 & 154/2005 H. R.; 1 ♂, [Iran], Ostan-Saheli [Hormozgan], B. Abbass-Djask [Jask], 22.5.1973, [leg.] Hasch.[emi], Broum.[and], gen. prep. 369/2005 H. R.; 1 ♂, 1 ♀, [Iran] Hormozgan, Geno Mt., 800 m., 15.-17.VI.1992, [leg.] Mirz.[ayans], Badii, gen. preps 139 & 155/2005 H. R.; 1 ♂, 1 ♀, [Iran] Hormozgan, Kuh-e Geno, 1500 m, 6.VI.1997, [leg.] V. Naz.[ari], gen. preps 144 & 152/2005 H. R.; 2 ♂, [Iran] Hormozgan, Siahu, Sikhoran, 830 m, 9.II.2001, [leg.] Ebra.[himi], Mof.[idi], gen. preps 216 & 138/2005 H. R.; 2 ♂, 1 ♀, [Iran] Kerman, Baft, Dareh-Pahn, 1750 m, 21.5.1977, [leg.] Safavi, Pazouki, Abai, gen. preps 120, 121 & 240/2005 H. R.; 1 ♂, [Iran, Balouchestan], Jebal-e-Barez, 19.4.1971, [leg.] Saf.[avi], Zair., gen. prep. 102/2005 H. R.; 1 ♂, [Iran, Fars], Miandjangan, 29.4.1971, [leg.] Saf.[avi], Zair., gen. prep. 355/2005 H. R.; 1 ♂, 1 ♀, [Iran, Kerman] 35 km. Djiroft [Jiroft], Mohamadabad, 3.-4.5.1973, [leg.] Broum.[and], gen. preps 302 & 303/2005 H. R.; 2 ♂, 1 ♀, [Iran, Kerman] Jiroft, Sfandagheh, Sargaz, 1650 m, 17 & 20.5.1977, leg. Safavi, Pazouki, gen. preps 110, 367 & 368/2005 H. R.; 1 ♂, [Iran], Khuzestan, Malavi, Pole-dokhtar, 14.5.1975-730 m, [leg.] Pazouki, Boroumand, gen. prep. 333/2005 H. R.; 1 ♂, Iran, Khuzestan, Andimeshk, Balarud, 650 m, 8.V.1998, [leg.] Ebra.[himi], Mof.[idi], gen. prep. 123/2005 H. R.; 1 ♂, Iran, Khuzestan, Andimeshk, Pole-dokhtar, 335 m, 7.5.1975, [leg.] Pazouki, Boroumand, gen. prep. 122/2005 H. R.; 1 ♂, S Iran, Strasse Banadar Abbas-Sirjan km 40, 300 m, 30.3.1973, leg. M. Abai, gen. prep. 312/2005 H. R., all in HMIM. 9 ♂, 5 ♀, Iran, prov. Fars, S Zagross, 8 km NE of Tangebollahayat (to Shiraz), 1750 m, 08-09.06.2005, leg. P.Gyulai & A. Garai, gen. preps 519, 520, 521, 963, 964 & 965/2009 H. R.; 15 ♂, 8 ♀, Iran, prov. Fars, S Zagross, 40 km SW of Sivand, 09-10.06.2005, leg. P.Gyulai & A. Garai, gen. preps 511, 514, 935, 937, 966, 967, 968 & 969/2009 H. R.; 19 ♂, 4 ♀, Iran, prov. Fars, S Zagross, 5 km NE of Saidatshahr, 09-10.06.2005, leg. P.Gyulai & A. Garai, gen. preps 507, 508, 510, 930, 931, 932, 933 & 750/2009 H. R.; 1 ♂, 1 ♀, [Iran, Fars], Mianjangan, 12.09.1971. [leg.] Broom.[and], gen. prep. 711/2009 H. R.; 25 ♂, 27 ♀, S Iran, Straße Shiraz-Kazerun, Imamsade, 1200 m, 03.06.1969, leg. G. Ebert, gen. preps 496, 499, 729, 731, 875 & 878, 879 & 880/2009 H. R., SEM prep. no. ♂ 5/2010 H. R.; 18 ♂, 19 ♀, S Iran, [Fars] Miyan Kotal, 1900 m, östl. Kazerun, 51° 40' ÖL./29° 30' nB., 4.-7.6.1969, leg. G. Ebert, gen. preps 500 & 712/2009 H. R.; 1 ♂, S Iran, [Fars] 100 km s. Abadeh, n. Didegan, 2000 m, 9.6.1969, leg. G. Ebert, gen. prep. 494/2009 H. R.; 6 ♂, 4 ♀, S Iran, Tange-tchogan, 930 m, 30 km, n. Kazerun, 23.03.73, leg. H.G. Amsel, gen. preps 455, 489,

490 & 491/2009 H. R.; 6 ♂, 3 ♀, Iran, Balutschestan, Khasch, 3 km S Sangan, 1550 m, 19.5.1972, leg. Ebert & Falkner, gen. preps 430, 431 & 877/2009 H. R.; 8 ♂, 5 ♀, Iran, Balutschestan, Nikschahr, Tange Sarheh 1100 m, 16.05.1972, leg. Ebert & Falkner, gen. preps 433, 434 & 435/2009 H. R.; 3 ♂, 3 ♀, [Iran, Balutschestan] Djebal-Barez, 19.4.1971, leg. Saf.[avi] & Zair, gen. preps 447 & 448/2009 H. R.; 4 ♂, 1 ♀, Iran, Balutschestan, Khasch, 11 km NE Karvandar, 1300 m, 13.5.1972, leg. Ebert & Falkner, gen. prep. 441/2009 H. R.; 1 ♂, Iran, Balutschestan, 18 km W Iranschahr, Rig-Kabud, 500 m, 15.5.1972, leg. Ebert & Falkner, gen. prep. 442/2009 H. R.; 4 ♂, 19 ♀, S Iran, [Hormozgan] Bandar-Abbas, km 107 d. Strasse nach Sirdjan [Sirjan], 850 m, 7.3.1973, leg. G. Ebert, gen. preps 463 & 465/2009 H. R.; 1 ♂, S-Iran-Hormozgan, Bashagerd Mts. Angohran vil. 26°27' N; 57°54' E, 25-26.III.2000, leg. Victor Siniaev, gen. prep. 973/2010 H. R.; 25 ♂, 43 ♀, S Iran, [Hormozgan] Bandar-Abbas, Kuhe Genou, S-exp. 550 m, 1. u 5.3.1973, leg. G. Ebert, gen. preps 467, 468 & 469/2009 H. R., SEM prep. no. ♂ 4/2010 H. R.; 1 ♂, 4 ♀, S Iran, [Hormozgan] Banadar-Abbas, km 74 d. strasse nach Sirdjan, 450 m, 7.3.1973, leg. G. Ebert, gen. prep. 725/2005 H. R.; 2 ♂, S Iran, [Hormozgan] strasse Banadar-Abbas-Sirjan, km 40, 300 m, 30.3.1973, leg. H. G. Amsel, gen. prep. 720/2005 H. R.; 1 ♂, S Iran, [Hormozgan] Bandar-Abbas, 42 km N, Kuhe Genou, E-exp., 200 m, 6.3.1973, leg. G. Ebert, gen. prep. 724/2009 H. R.; 2 ♂, N Iran, Elburs mts., prov. Tehran, Arangeh, 25 km N Karadj [Karaj], 1550 m, 4.7.1972, leg. Ebert & Falkner, gen. prep. 385/2009 H. R.; 7 ♂, 1 ♀, Iran-Centr., prov. Yazd, N Yazd, Chak Chak, N32° 20'07" E054°22'58.0", 1550 m NN, 10.-11.April 2007, leg. R. Trusch, gen. preps 707, 708 & 709/2009 H. R.; 1 ♂, Iran, prov. Yazd, Shirkuh mts., 6 km NW Taft, Aliabad, 2200 m, 10-11.06.2005, leg. P. Gyulai & A. Garai, gen. prep. 456/2009 H. R.; 2 ♂, 1 ♀, Iran, prov. Bushehr, S Zagross, Thang e Ram [Tange Eram], near Dalakhi, 400 m, 07.-08.06.2005, leg. P. Gyulai & A. Garai, gen. preps 587 & 972/2009 H. R., SEM prep. no. ♀ 39/2010 H. R.; all in SMNK. 1 ♂, Iran, prov. Fars, 5 km S of Dehbid, 2040 m, 2.v.2000, leg. Szabo & Hentschel, gen. prep. 815/2009 H. R.; in PCMS. 1 ♂, S Iran, Hormozgan, Beshagerd Mts., Angohran vil. N26°27' E 057°54', 25.-26.3.2000, leg. Victor Siniaev, gen. prep. 804/2009 H. R.; 1 ♂, N-Oman, Musandam, env Sayhakil, 600-950 m, 28.04. et 03.05.1992, leg. A. Legrain, J. Plante, Fr. Aulombard, gen. prep. 869/2009 H. R.; 1 ♂, NE Iran, Mazandaran prov., west Kopet Dag, Kosh Yeylag; 2600 m, Anf.VII.2002, leg. Müller, gen. prep. 812/2009 H. R.; all in ZSM. 3 ♂, Iran, Fars, Strasse Chiraz-Kazeroun, Fort Mian Kotal, ca. 2200 m, 7.5.1937, coll. Brandt; 1 ♂, same data and locality, Wehrli genitalia gen. prep. 7404; 1 ♂, same locality, 2.-4.5.1937; 1 ♂, same locality, May 1937, coll. Brandt; all in ZFMK. 3 ♂, Iran, Fars prov., Estahban to Sarvestan road, 20 km to Sarvestan, after Ab Asemani village, N29°05'51" E 053° 26'12", 1890 m, 22.May.2009, Biotop with Amygdalus bushes, leg. H. R., gen. preps 943, 944 & 945/2010 H. R.; in coll. H. Rajaei.

Total number of specimens studied: 221 ♂, 177 ♀ (Except type material).

***G. rubraria* Staudinger, 1892**

7 ♂, 1 ♀, Syria sept. Taurus, o. Marasch, 10-1500 m, 10.-25.VI.[19]29, leg. Einh. Slr, gen. preps ♂ 5136, 5137 (Wehrli) and 995/2010 H. R.; 1 ♂, 1 ♀, Same locality & leg., 15.30.VII.[19]29; 1 ♀, Same locality & leg., VIII.[19]29; 16 ♂, 1 ♀, Same locality & leg., 6-900 m, IV.[19]30, gen. preps ♀ 894/2009, ♂ 994 and 996/2010 H. R.; 7 ♂, 1 ♀, Same locality & leg., 6-900 m, V. [19]30, gen. preps ♂ 7224 (Wehrli), ♀ 893/2009 H. R.; 10 ♂, 1 ♀, Same locality & leg., 6-900, VI. [19]30, gen. prep. ♂ 997/2010 H. R.; 4 ♂, Same locality & leg., 6-900 m, VII.[19]30; 1 ♀, Same locality & leg., 6-900 m, VIII.[19]30; 10 ♂, 2 ♀, Same locality & leg., VII. [19]31, gen. preps ♂ 419/2009 and 991/2010 H. R.; 21 ♂, 7 ♀, Same locality & leg., 6-900 m, V.[19]31; 23 ♂, 5 ♀, Same locality & leg., V.[19]33; 1 ♀, same locality and leg., 11.1929, 1000 m, gen. prep. 892/2009 H. R.; 1 ♂, Syria sept. Taurus m. (Achyr Dag), Maras, V.[19]33, coll. Pfeiffer, München; 1 ♂, Syria s., Anti-Taurus, Seitun, VIII.[19]31, coll. Pfeiffer, München; 9 ♂, 2 ♀, Syria s., Amanus s., Düldül Dag, Jeschil dere, 34, coll. E. Pfeiffer, München; 4 ♂, 4 ♀, same locality and leg, VI.[19]32, coll. E. Pfeiffer, München; 1 ♂, Palaestina, gen. prep. 998 /2010 H. R.; 1 ♂, Anatolia, Ankara, 13.7. [19]65, leg. E. Pfeiffer, München, gen. prep. 928/2010 H. R.; 1 ♂, 2 ♀, Asia min., Malatya, Tecde, 30.V., gen. prep. 990/2010 H. R.; all in ZFMK. 3 ♂, 1 ♀, Palästina, Ex. Coll. Daub, gen. preps 641, 642 & 733/2009 H. R.; 1 ♂, 1 ♀, Syria, 25 km WV Damaskus, 17.-18.v.1961, leg. Kasy & Vartian, gen. prep. 658/2009 H. R.; 5 ♂, 6 ♀, Asia min., Turcia, Köprüköy, Kizilirmak, 750 m, 5.-8. & 20.-22.6.1969, leg. F. Hahn, gen. preps 648, 649, 652, 653 & 654/2008 H. R., 895 & 896/2009, SEM preparation no. 28/2010 H. R.; 1 ♂, Asia min. Turcia, Karapinar, 995 m (Versuchsgut), am 23.6.1968, leg. F. Hahn, gen. prep. 656/2008 H. R.; 12 ♂, Anatolien, Ankara, 1000 m, Juni 1934, Herbert Noack leg., gen. preps 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, & 640/2008 H. R.; 1 ♂, 2 ♀, Anatolien: [Türkei] Ankara, Juni. 1934, leg. Herbert Noack, gen. prep. ♂ 737, SEM preparation ♀ no. 29 & 30/2010 H. R.; all in SMNK; 2 ♂, Jordan, Irbid, 900 m, Mid.IX.2000, leg.

Müller, gen. preps 845 & 846/2009 H. R.; 3 ♂, C. Israel, Tamun, 14 km NE Nablus, 430 m, 15.V.1999, leg. Müller, gen. preps 847 & 848/2009 H. R., SEM prep. no. 14/2010 H. R.; 1 ♂, Syria S. Taurus, Marasch, 14.V.1923, leg. S. Pfeiffer, Staatssamlg. München, gen. prep. 849/2009 H. R.; 1 ♂, S Türkei, Halfeti, 10.06.1996, leg. Geck, gen. prep. 835/2009 H. R.; 1 ♂, Türkei, prov. Urfa, 2 km N of Halfeti, N 37°38' E 38°03', 6.-7.IV.1994, 400 m, leg. Csovari & Hreblay, gen. prep. 836/2009 H. R.; in PCMS. 1 ♂, Jordan, Gouvern, At Tafila, Dhana, Natural reserve, N 30°37'11" E 35°37'37", 1300 m, ü.NN, 22.-24.05.2010, leg. R.&S.Fiebig; 1 ♂, jordanian, Gouvernment Ajlun, Ajlun Nature Reserve, N 32°23'29" E 35°46'19", 8600 m ü.NN, 09.-10.05.2010, leg. R.&S.Fiebig; 6 ♂, Türkei centr., Provinz Nevşehir, Kappadokien, Göreme, N 38°39', O 34°50', 1080-1150 m ü.NN, 25.-28.06.2001 LF, leg. Fiebig & Rothe; 2 ♀, 8 ♂, Türkei Centr., Provinz Nevşehir, Kappadokien, Ürgüp 4 km NW, N 38°39'52" E 34°53'27", 1120 m ü.NN, 19.05.2009, L.F., leg. Fiebig & Rothe; 9 ♂, 1 ♀, same data, 03.-06.07.2008 LF, leg. Ralf & Sylvana Fiebig; 3 ♀, Türkei Centr., Provinz Nevşehir, Kappadokien, Ürgüp 3 km NW, N 38°39'41" E 34°54'33", 1040 m ü.NN, 17.05.2009, L.F., leg. Fiebig & Rothe; 7 ♂, 3 ♀, Türkei Centr., Provinz Nevşehir, Kappadokien, Avanos 3.5 km NNW, N 38°44'20" E 34°53'28", 1040 m ü.NN, 18.05.2009, L.F., leg. Fiebig & Rothe; 8 ♂, 2 ♀, Türkei Centr., Provinz Malatya, Darrende 7.3 km SSO, 1030 m ü.NN, N 38°29'57" E 37°31'26", 22.05.2009, L.F., leg. Fiebig & Rothe; all in coll. PCRF; 1 ♂, Asia min., Turcia Kizilcahamam, 925 m, 19.6.-6.7.1965, leg. M. u. W. Glaser, gen. prep. 839/2009 H. R.; 2 ♂, Asia min., Kirillale, 65 km östl. Ankara, 29.5.1964, leg. J. Klimesch, gen. preps 843 & 853/2009 H. R.; 1 ♂, Süd-Türkei, 47 km Westl., Silidke, 150 m, 05.Mai.1996, leg. E. Sepp, gen. prep. 842/2009 H. R.; 1 ♂, Asia minor, Sille p. Konya, 10.6.1966, [leg.] J. Klimesch, gen. prep. 865/2009 H. R.; 1 ♂, Asia min. NW-Ende, d. Beyşehir gölü, 1100 m, 4.6.1964, [leg.] J. Klimesch, gen. prep. 866/2009 H. R.; all in ZSM. 1 ♂, Türkei, Zentral-Anatolien, prov. Nevşehir, Göreme, ca. 900 m, 15.VI.1991, leg. J. Gelbrecht, E. Schwabe, gen. preps 738 & 744/2009; 1 ♂, same data, 17.-19.VI.1991, gen. prep. 739/2009 H. R.; 2 ♂, Zentral Türkei, Kappadokien, Prov. Nevşehir, Ürgüp, 1100 m, 16.VI.1996, leg. J. Gelbrecht, E. Schwabe, gen. preps ♂ 740, 741 ♀ 897 & 898/2009 H. R.; 1 ♂, Türkei, Mersin, 27 km N Anamur, (Ermenek), Taurus, 750 m, 13.VII.1987, leg. M. Fibiger, gen. prep. 742/2009 H. R.; 1 ♂, Zentral Türkei, Hasan Dagı, 20 km S Aksaray, b. Karacaöven, 1100 m, 9.VI.1996, leg. J. Gelbrecht, S. Beshkov & T. Drechsel, gen. prep. 743/2009 H. R.; all in PCJG. 3 ♂, Asia min. Turcia, Karapinar, 995 m, 15.-17.6.1969, leg. G. Friedel, gen. preps 840 & 841, SEM preparation no.13/2010 H. R.; 1 ♂, Asia min. Ankara, Cubuk-Barage, 5.-17.5.1967, Friedel leg., gen. prep. 844/2009 H. R.; all in PCMS. 3 ♂, Türkei, prov. Nevşehir, Ürgyp Müllhalde, 1014 m, N 38° 39' 25" E 34°54'53", 19.-29.05.2009 TF/LF, leg. D. Stadie & H. Löbel, gen. preps 980, 981, 982 & 983/2010 H. R.; 4 ♂, Türkei, prov. Malatya, Darende Umg. 1050 m, N 38° 29' 47" E 37°31'15", 22.05.2009 TF/LF, leg. D. Stadie & H. Löbel, gen. preps 984, 985, & 986/2010 H. R.; 1 ♂; Türkei, prov. Antalya, Termessos Nationalpark, N 36°59'22" E 30°32'11", 15.05.2009 TF/LF, 370 m, leg. D. Stadie & H. Löbel, gen. prep. 987/2010 H. R.; all in PCDS. 1 ♂, [Turkey] Mardin | 97, [leg.] Slam, Rubraria, Stgr. 111, *rubraria*, gen. prep. 406/2008 H. R.; in MNHU.

Total number of specimens studied: 223 ♂, 50 ♀ (Except type material).

***G. sarobiana* Ebert, 1965**

2 ♂, NW Pakistan, 3 km NW of Garam Chasma, 2600 m, 36°05'N, 71°22'E, 23.vi.1992, & leg. J. Plante, gen. preps 610 & 923/2009 H. R., in ZFMK, 1 ♂, Afghanistan, Paghman, 2500 m, 20.07.1941, leg. F. Brandt, gen. prep. 589/2009 H. R.; 2 ♂, Afghanistan, Sarobi, 15.05.62, leg. ML, gen. preps 594 & 595/2009 H. R.; 1 ♀, same locality, 15.4. [19]61 ML, gen. prep. 904/2009 H. R.; 1 ♀, same locality, 25.5. [19]62 ML, SEM prep. no. ♀ 24/2010; 1 ♀, same locality, 7.4. [19]61 ML, SEM prep. no. 25/2010 H. R.; 3 ♂, Afghanistan, Kabul Schlucht, 22 km östl. Kabul, 1650 m, 5.-12.06.1966, leg. G. Ebert, gen. preps 620, 621 & 622/2009 H. R.; 4 ♂, O Afghanistan, Khurd Kabul, SO v Kabul. 1900 m, 19.6.1969, leg. Ebert, gen. preps 623 & 625/2009 H. R.; 1 ♂, O Afghanistan, Pr-Kunar, Nuristan. Ob. Lindai, Sin-Tal vic. Barg e Matal, 3 km Westlich Dorf, 2500 m, 6.7.70, leg. Naumann, Nr.ZMK77, gen. prep. 627/2009 H. R.; 1 ♂, Afghanistan, Ex. Coll. Baddenbruk, leg. Rasier, gen. prep. 643/2009 H. R.; 1 ♂, Afghanistan, Ex. Coll. Rasier, gen. prep. 644/2009 H. R.; 5 ♂, Afghanistan, 25 km N v Barikot, 1800 m, Nuristan, 12.-17.7.1963, leg. Kasy & Vartian, genitalia gen. preps 628, 646, 647, 650, 651 & 655/2009 H. R.; 1 ♂, Pakistan, 5 km SW Kotkai, gen. prep. 619/2009 H. R.; all in SMNK. 1 ♂, O Afghanistan, Sarobi, 1100 m, 30.V.1961, leg. G. Ebert, Staatssamlg. München, gen. prep. 822/2009 H. R.; in ZSM.

Total number of specimens studied: 22 ♂, 3 ♀ (Except type material).

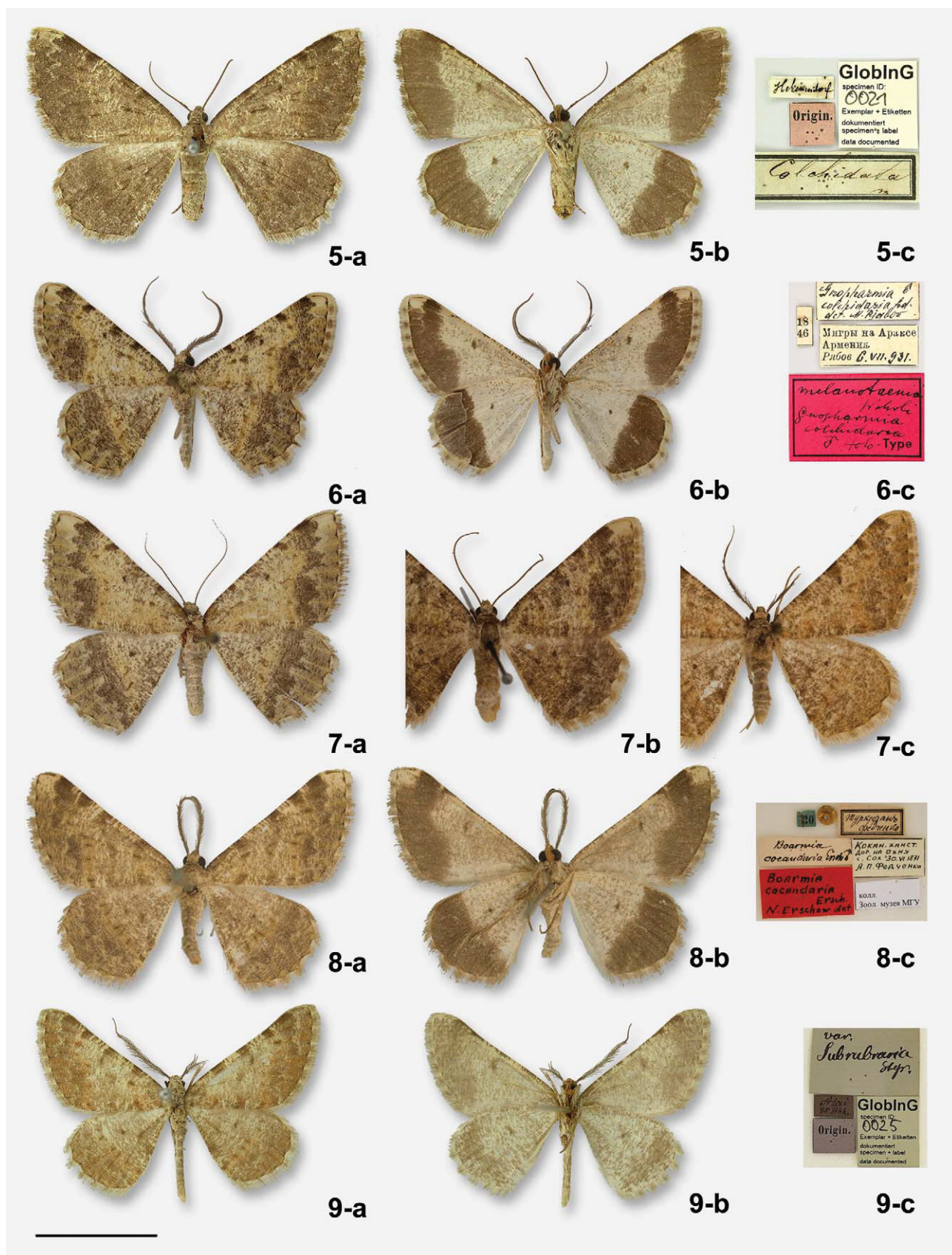


FIGURE 5–7. *G. colchidaria colchidaria*. 5: holotype, female; 6: *G. c. melanotaenia*, lectotype, male (labelled as “holotype” by Wehrli); 7: *G. c. melanotaenia*, a: paralectotype, female (labelled as “Allotype” by Wehrli), b & c: colour variants, both from Arax (Armenia); **FIGURE 8–9.** *G. cocandaria*, 8: holotype, male; 9: *G. rubraria subrubraria*, lectotype, male. a, upperside; b, under side (except fig. 7-b); c, original label (except fig. 7-c). Scale bar: 1 cm.

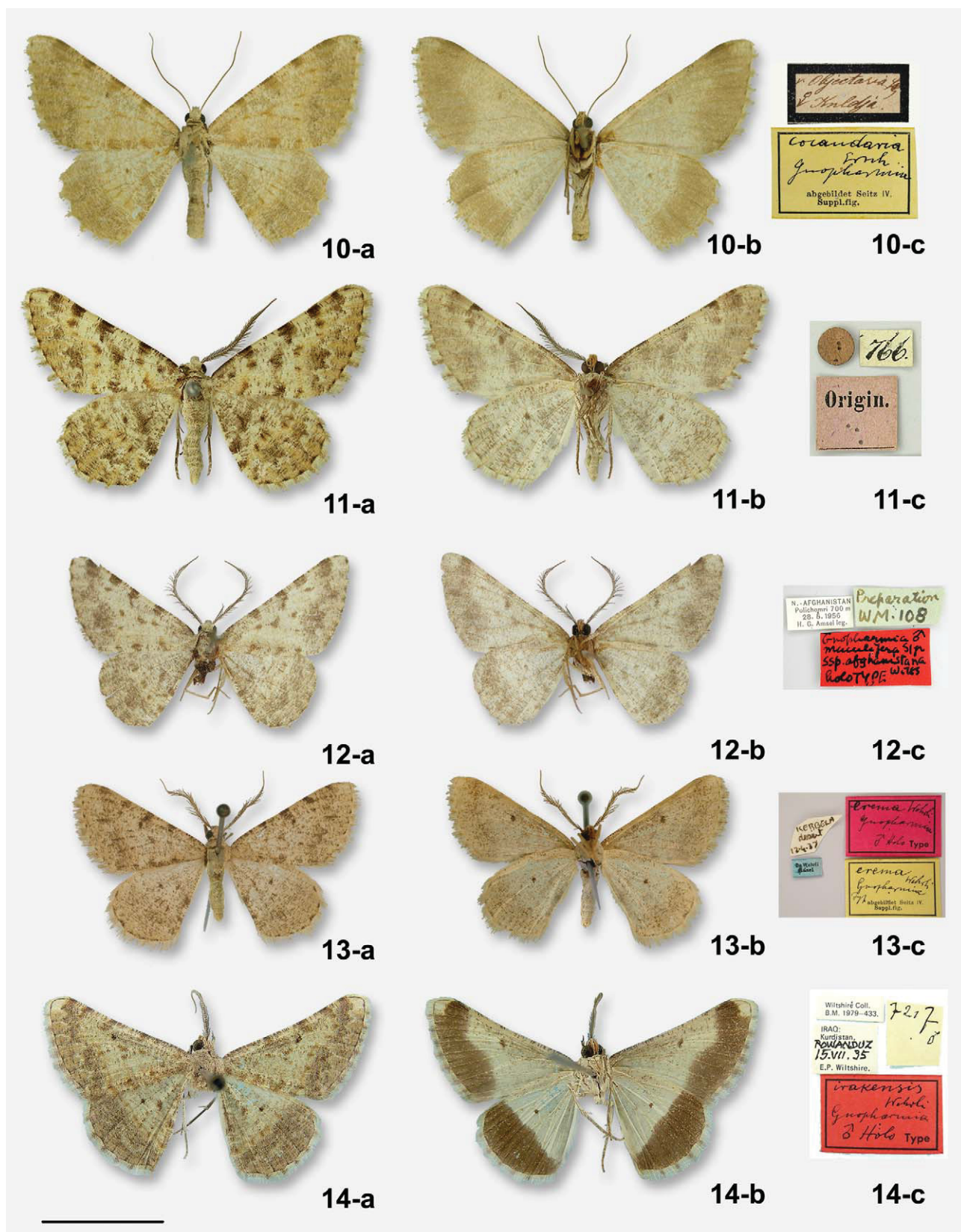


FIGURE 10–14. *G. cocandaria*. 10: female from Kuldja, cited and figured by Wehrli (1953) in Seitz 4 (suppl.); 11: *G. maculifera maculifera*, lectotype, male from Samarkand [Uzbekistan]; 12: *G. maculifera afghanistana*, holotype, male; 13: *G. erema*, lectotype; 14: *G. irakensis*, syntype, male. a, upperside; b, under side; c, original label. Scale bar: 1 cm.

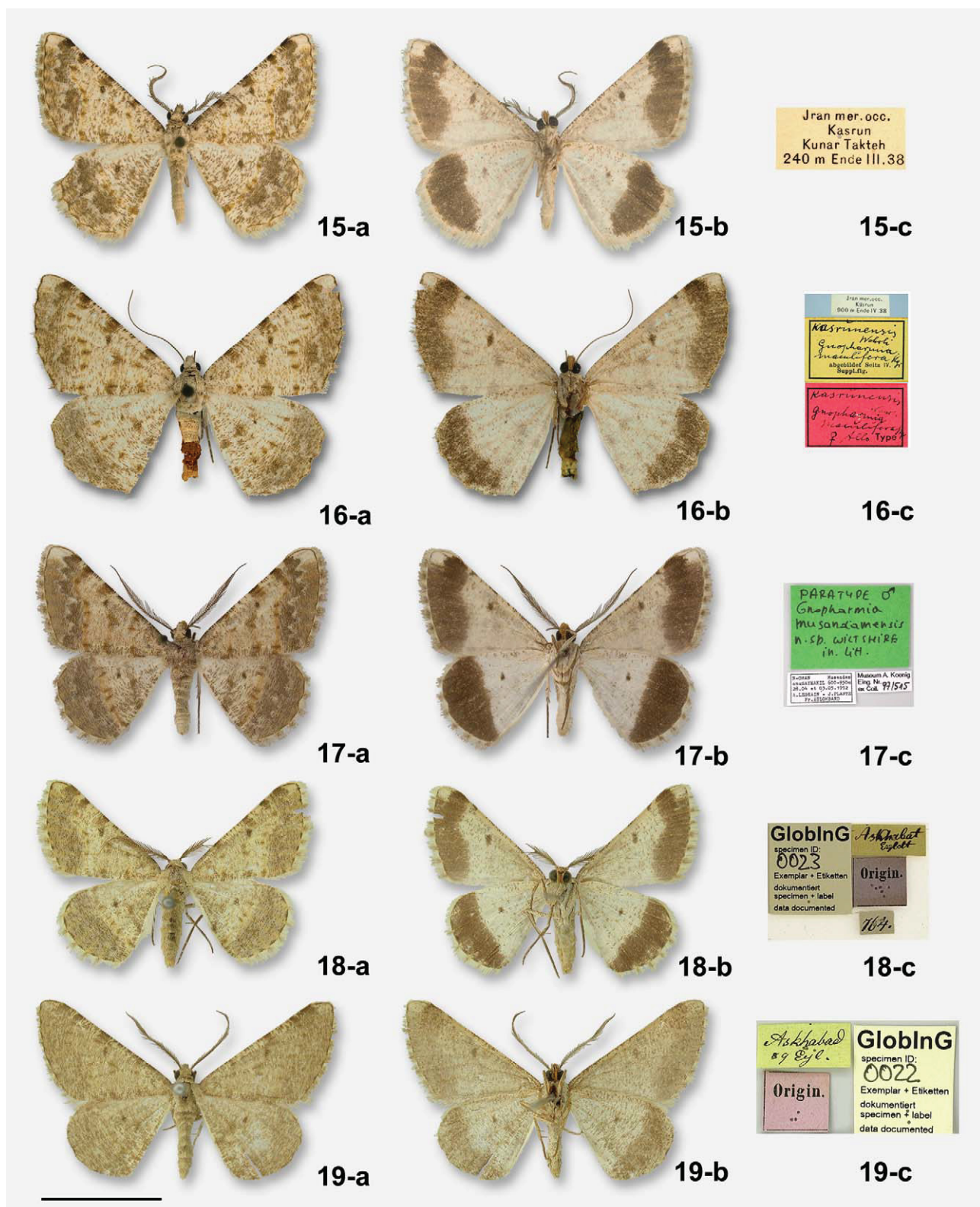


FIGURE 15–19. *G. kasrunensis*. 15: lectotype, male, 16: paralectotype, female, 17: “*G. musandamensis*”, from Musandam (Oman); 18: *G. colchidaria objectaria*, lectotype, male, 19: *G. colchidaria degeneraria*, lectotype, male; a, upperside; b, under side; c, original label. Scale bar: 1 cm.

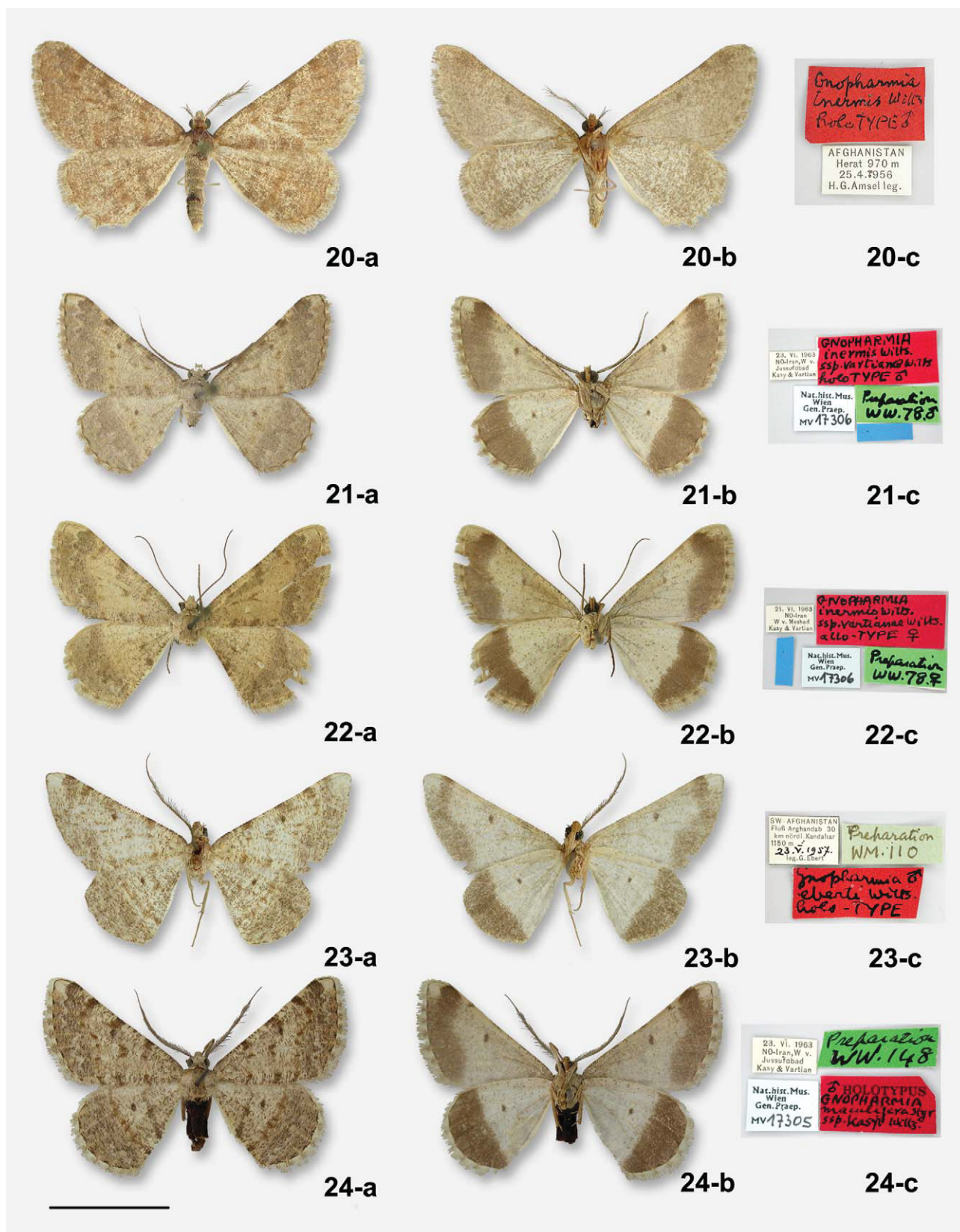


FIGURE 20–24. *G. colchidaria objectaria*. 20: *G. inermis*, holotype, male, 21: *G. inermis vartianae*, holotype, male, 22: *G. inermis vartianae*, “allotype”, female, 23: *G. eberti*, holotype, male, 24: *G. maculifera kasyi*, holotype, male. a, upperside; b, under side; c, original label. Scale bar: 1 cm.

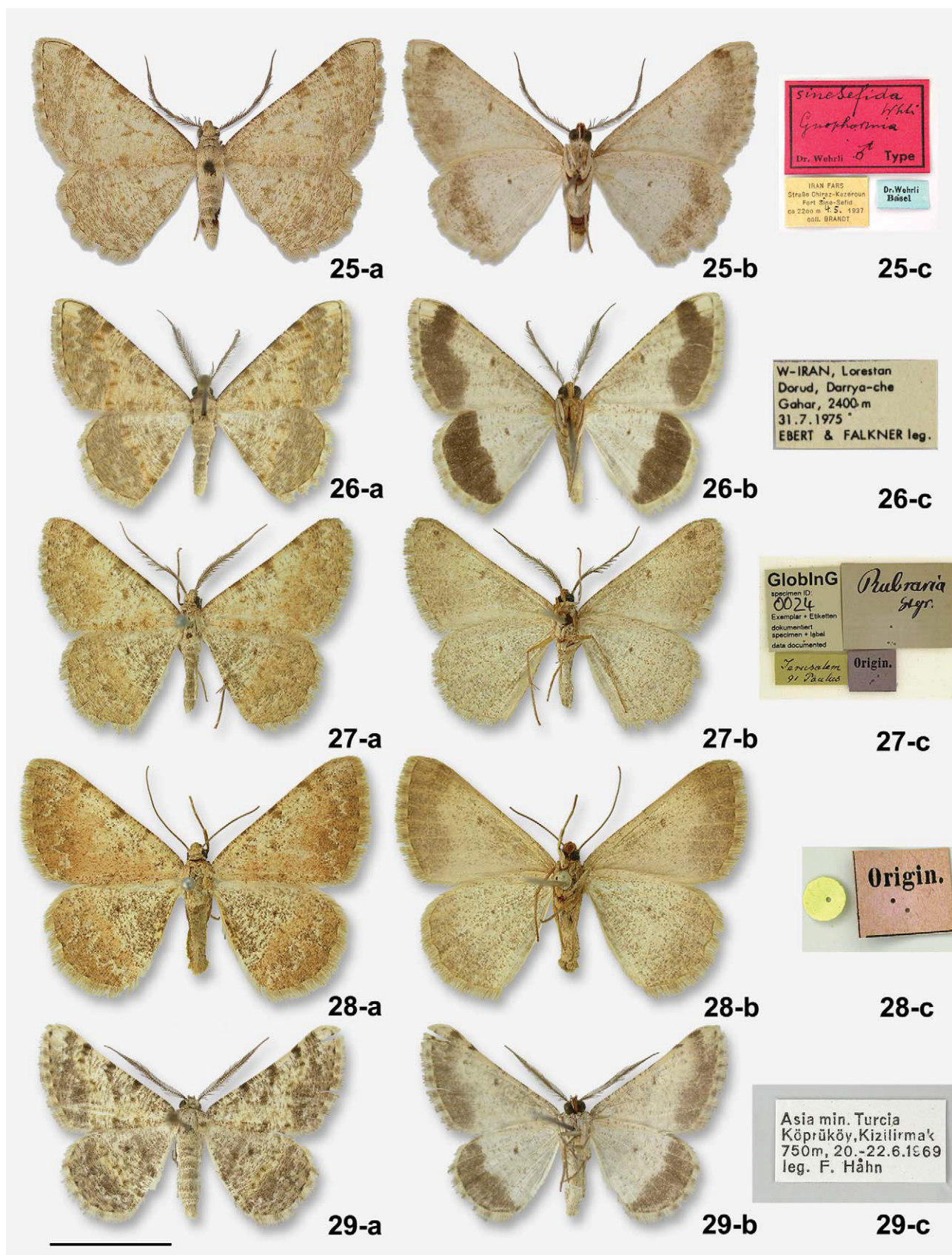


FIGURE 25–26. *G. colchidaria sineseffida*. 25: syntype, male, 26: male from Lorestan (W Iran); **FIGURE 27–29.** *G. rubraria*. 27: lectotype, male (Israel), 28: paralectotype, female, 29: male from central Turkey. a, upperside; b, under side; c, original label. Scale bar: 1 cm.

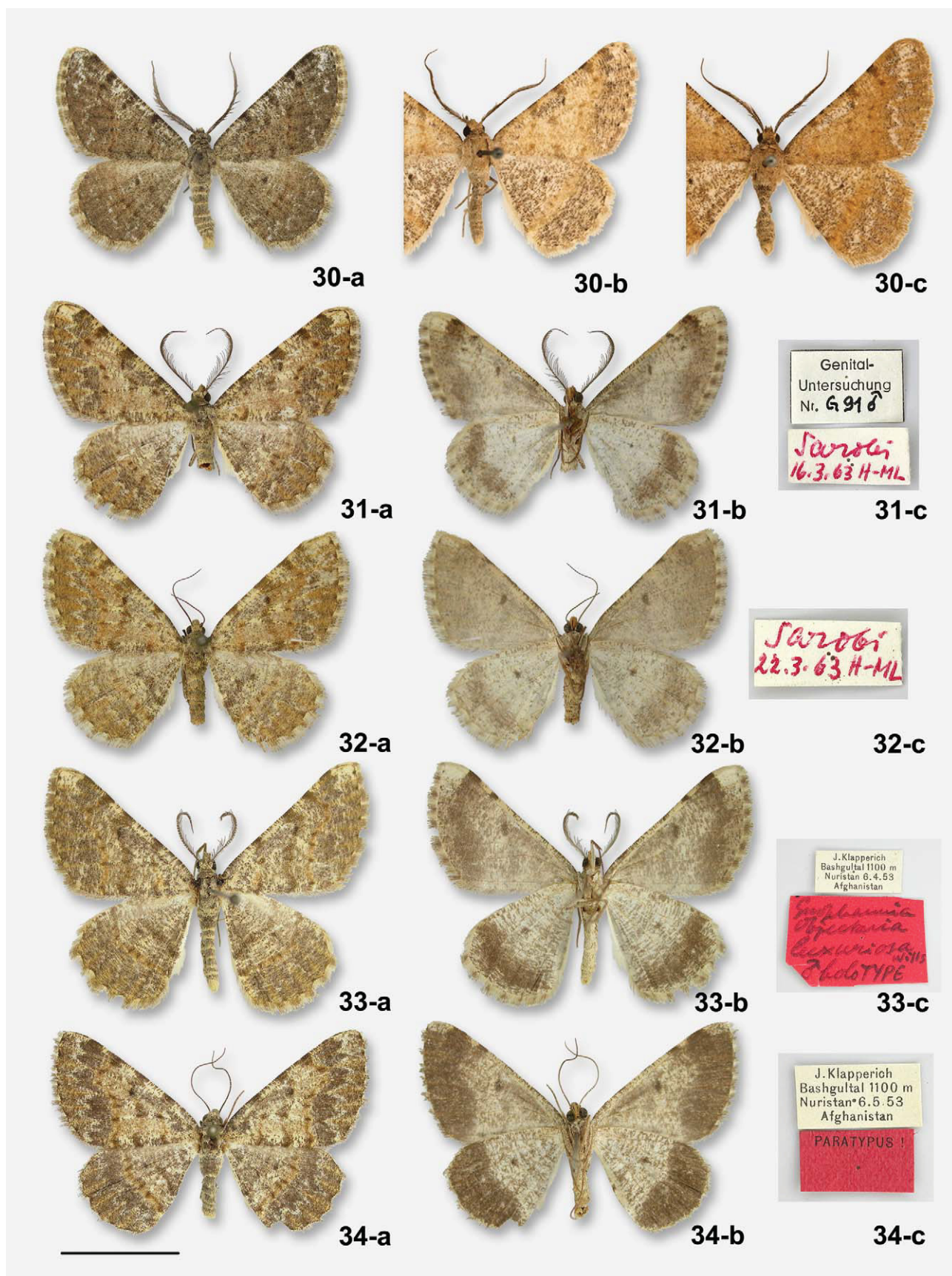


FIGURE 30–34. 30: *G. rubraria*, colour variants from: a, Kirikkale (Central Turkey), b–c, Marasch (Maraş, E. Turkey); 31–32: *G. sarobiana*, 31: holotype, male, 32: paratype, female, 33: *G. objectaria luxuriosa*, holotype, male, 34: *G. objectaria luxuriosa*, paratype, female. a, upperside; b, under side; c, original label (except fig. 30). Scale bar: 1 cm.

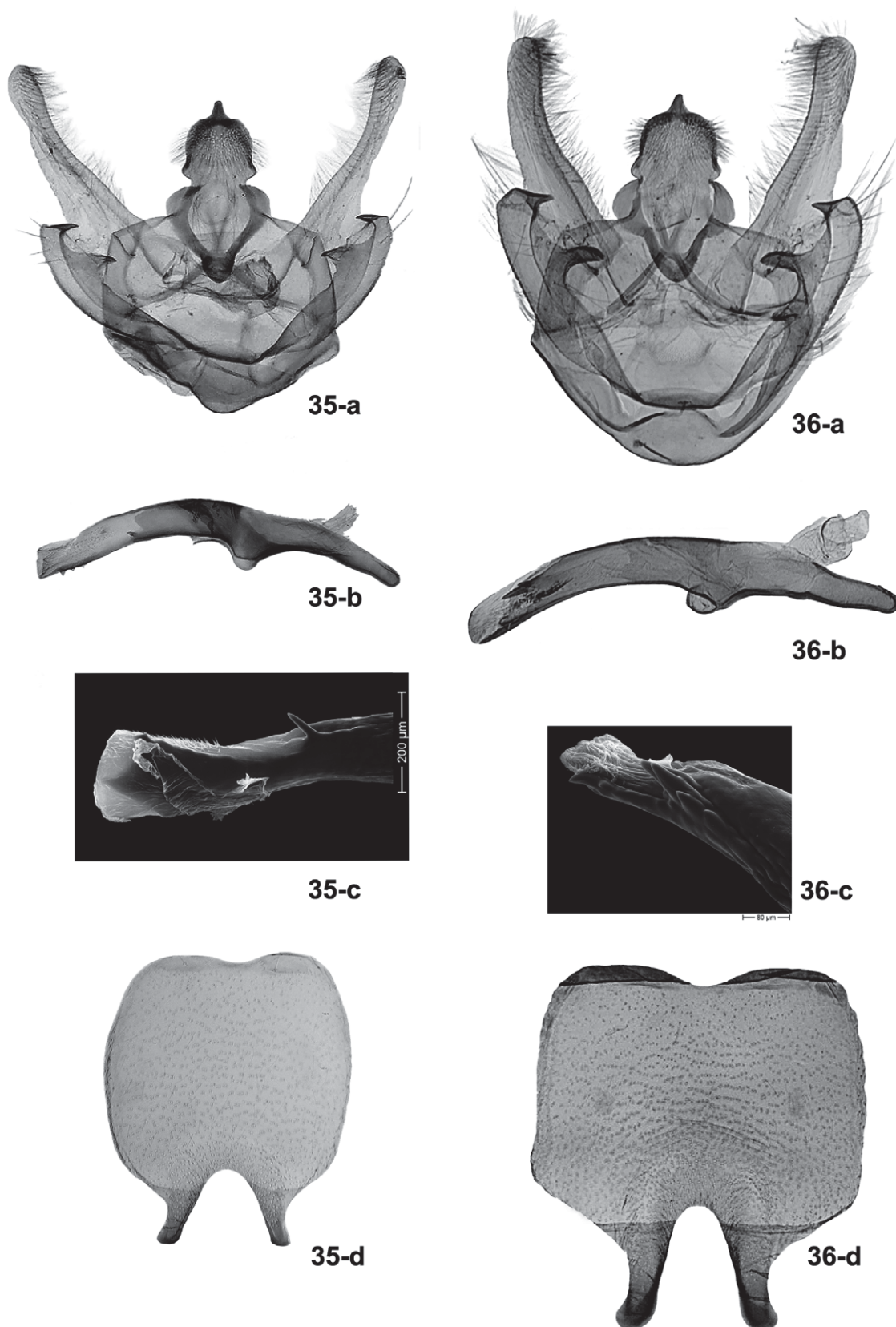


FIGURE 35–36. Male genitalia and abdominal sternites. 35: *G. colchidaria objectaria*, lectotype, gen. prep: 679/2008 R. Trusch, SEM prep. 10/2009 H. R., 36: *G. colchidaria sinesefida*, syntype, gen. prep: 414/2008 H. R. a: genital capsule; b: aedeagus; c: distal part of aedeagus (SEM; with scales) SEM prep. 20/2009 H. R.; d: sternite A8. Scale bar: 1 mm.

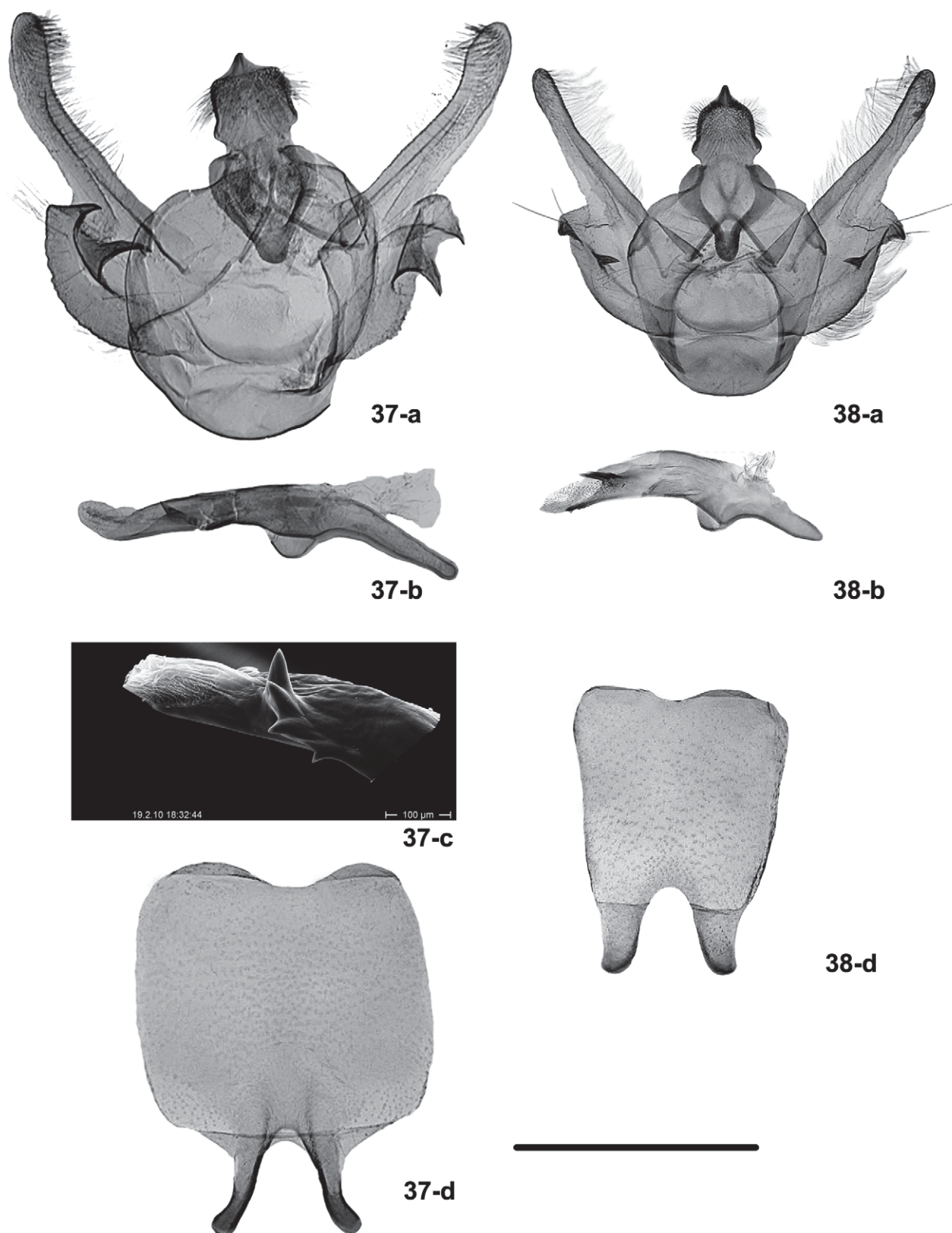


FIGURE 37–38. Male genitalia and abdominal sternites. 37: *G. colchidaria colchidaria*, lectotype of *G. colchidaria melanotaenia*, gen. prep: 415/2008 H. R., SEM prep. 17/2009 H. R., 38: *G. erema*, lectotype, gen. prep: 411/2008 H. R. a: genital capsule; b: aedeagus; c: distal part of aedeagus (SEM; with scale); d: sternite A8. Scale bar: 1 mm.

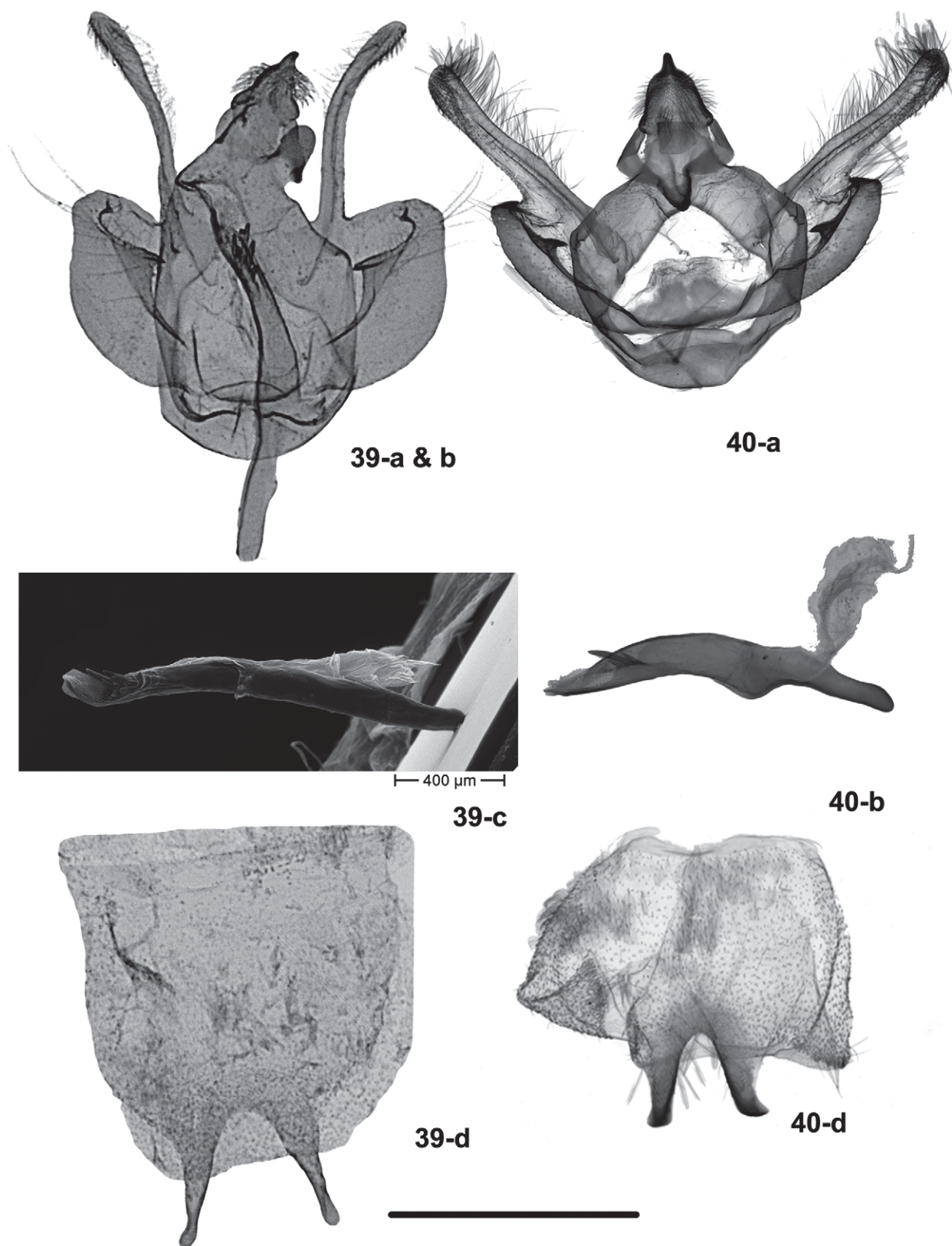


FIGURE 39–40. Male genitalia and abdominal sternites. 39: *G. irakensis*, syntype, gen. prep: 7217, by Wehrli, SEM prep. 6/ 2009 H. R.; 40: *G. sarobiana*, holotype, gen. prep: 91, G. Ebert. a: genital capsule; b: aedeagus; c: distal part of aedeagus (SEM; with scale); d: sternite A8. Scale bar: 1 mm.

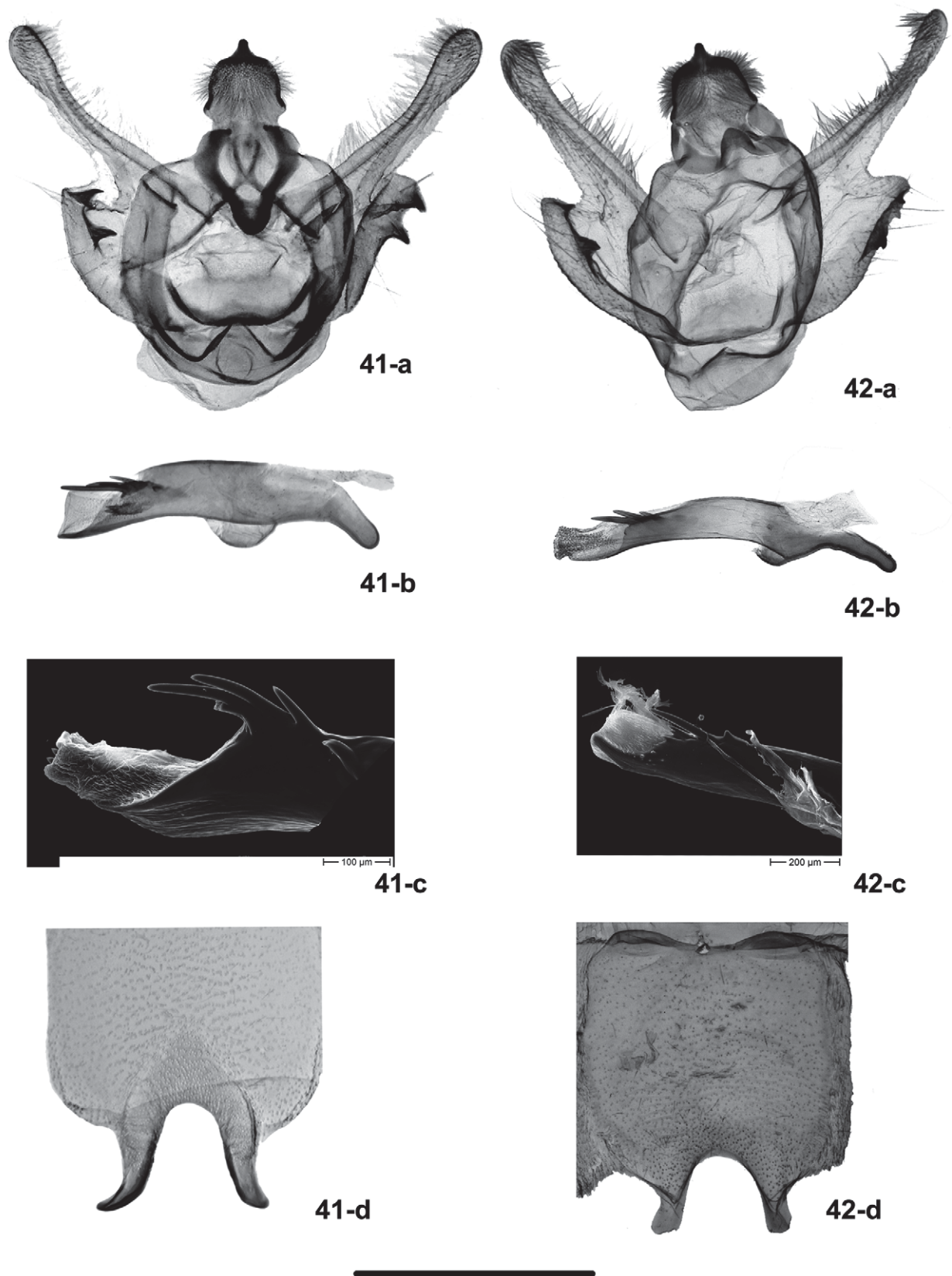


FIGURE 41–42. Male genitalia and abdominal sternites. 41: *G. kasrunensis*, paralectotype, gen. prep: 412/ 2008 H. R., SEM prep. 5/2009 H. R., 42: *G. cocandaria cocandaria*, holotype, gen. prep: 2225-DS, SEM prep. 15/2009 H. R. a: genital capsule; b: aedeagus; c: distal part of aedeagus (SEM; with scales); d: sternite A8. Scale bar: 1 mm.

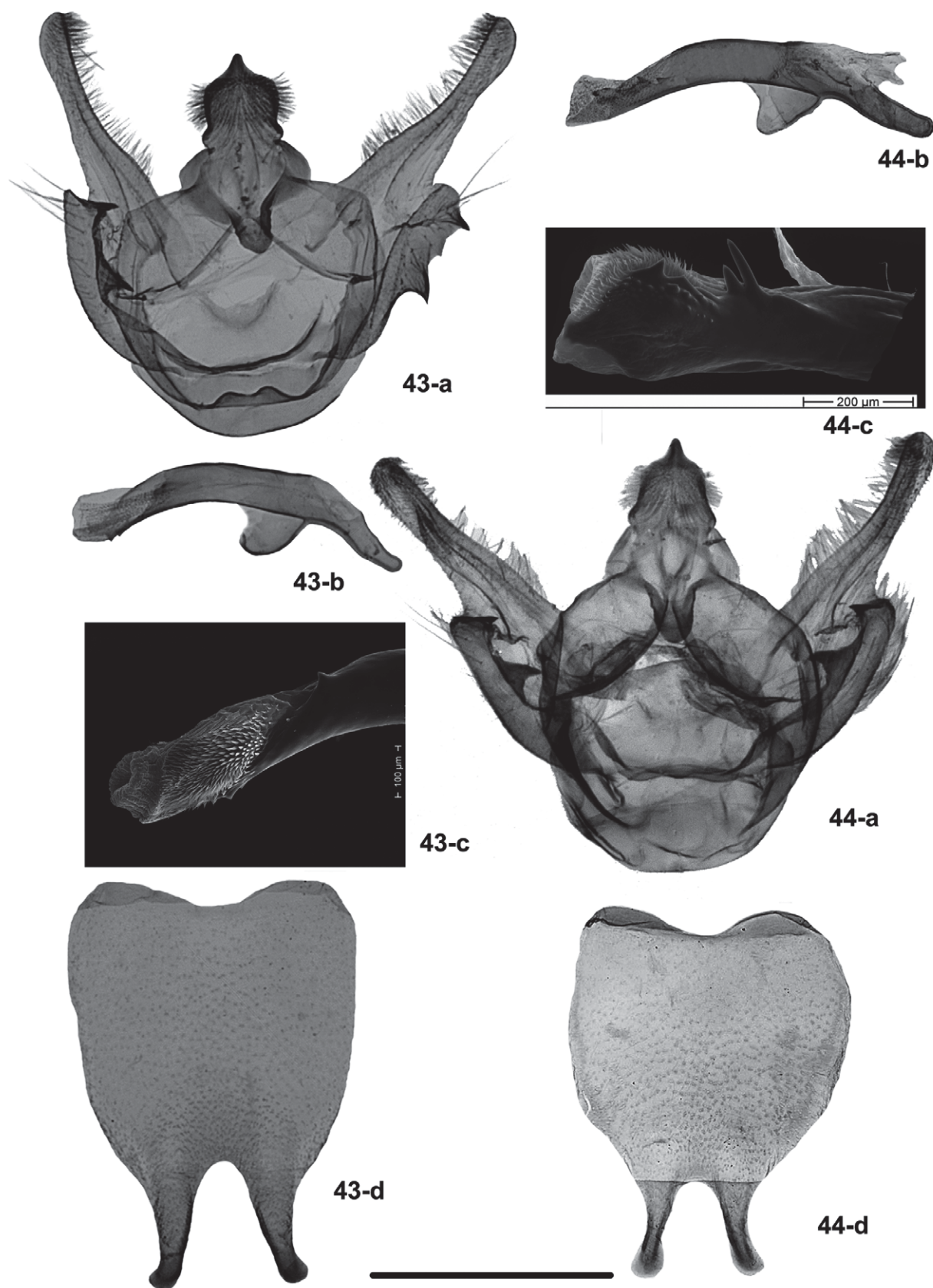


FIGURE 43–44. Male genitalia and abdominal sternites of *G. rubraria*, 43: specimen from Köprüköy, Kızılırmak (Central Turkey), gen. prep. 654/2008 H. R., SEM prep. 30/2009 H. R., 44: lectotype, gen. prep. 406/2008 H. R., SEM prep. 14/2009 H. R., a: genital capsule; b: aedeagus; c: distal part of aedeagus (SEM; with scales); d: sternite A8. Scale bar: 1 mm.

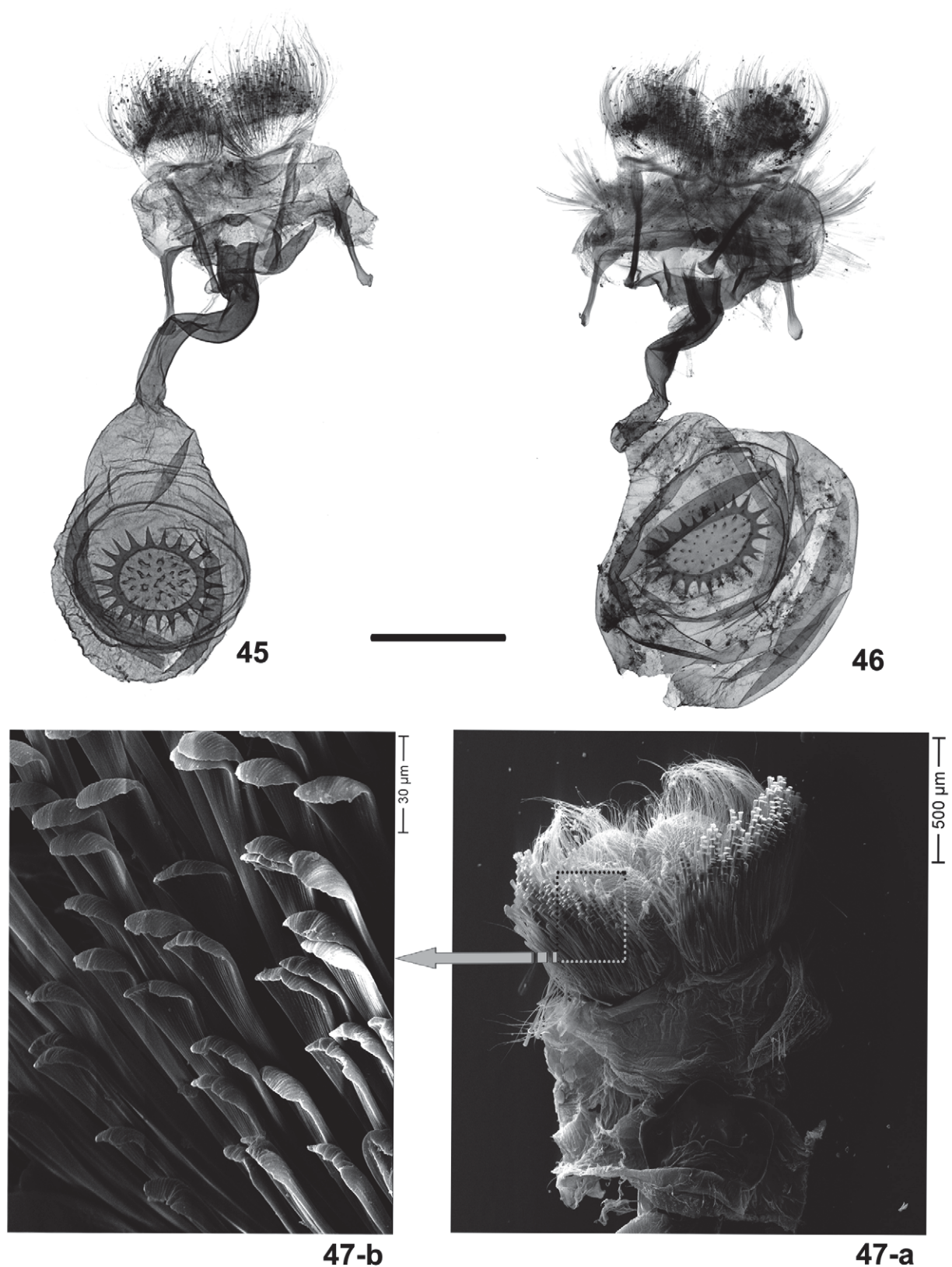


FIGURE 45–46. Female genitalia, 45: *G. rubraria* from Köprüköy, Kizilirmak (Central Turkey), gen. prep. 896/2008 H. R., 46: *G. colchidaria colchidaria*, holotype, gen. prep. 408/2008 H. R. Scale bar: 1 mm. **FIGURE 47.** *G. colchidaria sineseftida*, SEM prep. 21/2009 H. R.; with scales, a: papillae analis, with groups of floricomous setae; b: enlarged apices of floricomous setae.

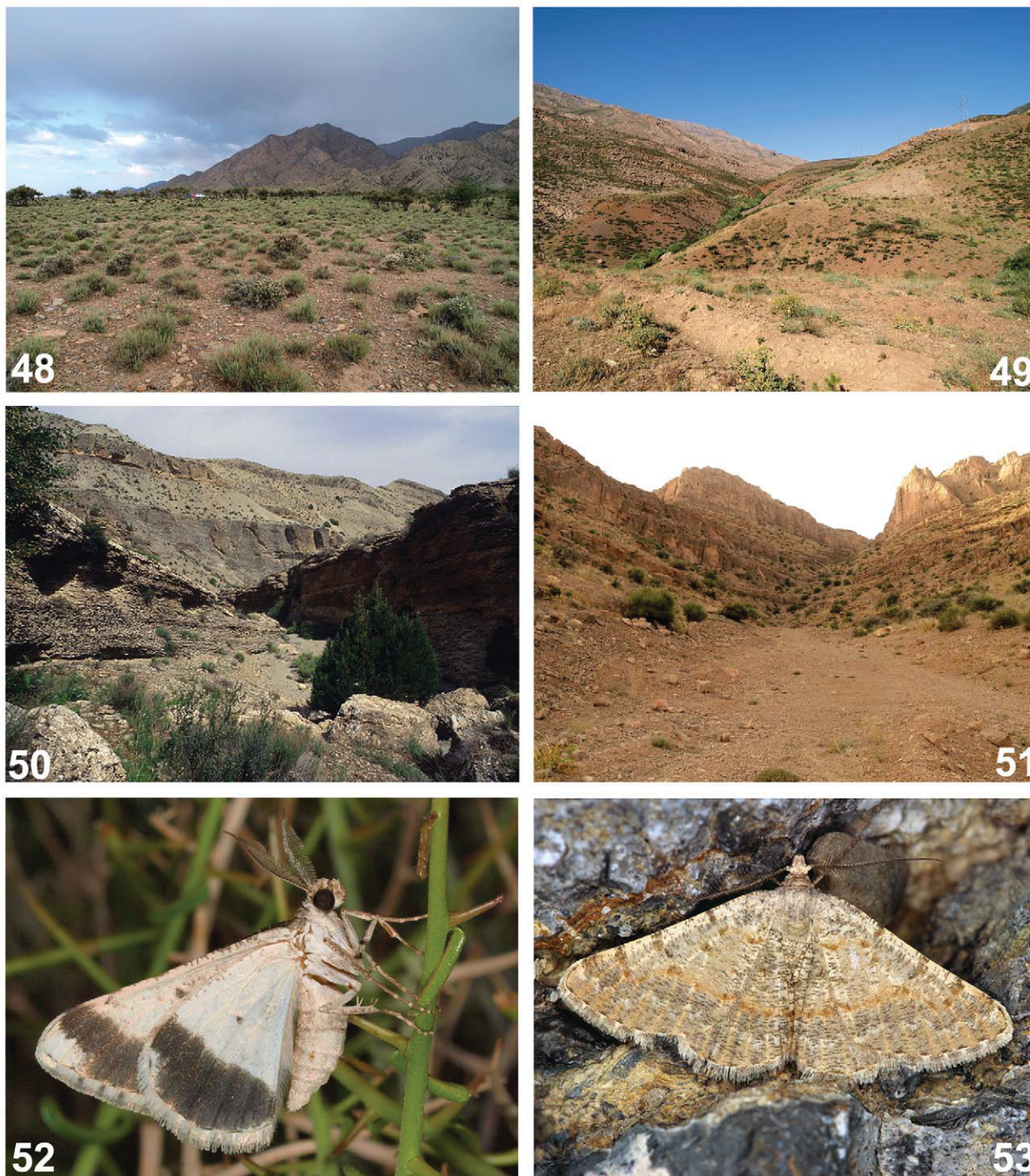
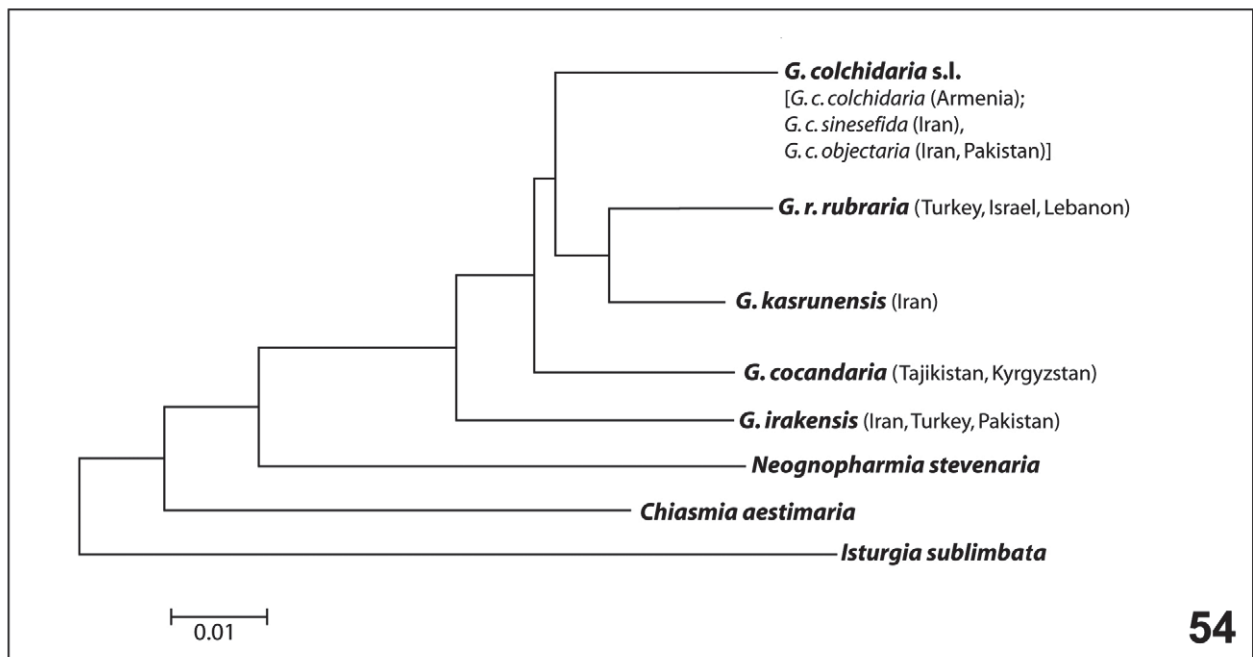


FIGURE 48–53. Habitats and *Gnopharmia* moth in the nature. 48, 49, 51: habitats of *G. colchidaria sinesefida*, 48: Dehbakri, S. Bam, Kerman prov., 1940 m; 49: Saghez-Baneh road, Garnadeh-Khan, Kordestan prov., 1976 m; 51: Hanna protected area, Isfahan prov., 2435 m (near and very similar to type-locality of *G. sinesefida*); 50: habitat of *G. colchidaria objectaria*: S Izmansufla, Kopet Dag, N Khorasan, 1240 m; 52: *G. colchidaria sinesefida* in Dehbakri; 53: *G. colchidaria objectaria*, in Izman Sulfa, Kopet Dag Mt., N Khorassan. Photos by Robert Trusch (50 & 53) and Hossein Rajaei (48, 49, 51, 52).



54

FIGURE 54. Maximum Likelihood tree based on GTR model parameter calculated with MEGA 5 (Tamura et al., 2011). Barcode data from BOLD (Barcode of Life Database, cf. Ratnasingham & Hebert, 2007).